Electrical West

With which is consolidated the Journal of Electricity

A McGraw-Hill Publication | AUGUST 1, 1928 | Twenty-five Cents Per Copy

Milestones of Progress
SD
Beacon tower of the Standard Oil Co. of Calif. on Mt. Diablo, built by the Pacific Coast Steel Company.
PACIFIC COAST STEEL COMPANY
MANUFACTURERS OF
OPEN HEARTH STEEL
STRUCTURAL SHAPES MERCHANT AND REINFORCING BARS
TRANSMISSION TOWERS AND STRUCTURES
Gen'l Office: Hunter-Dulin Bldg., San Francisco
Plants: San Francisco, Portland, Seattle

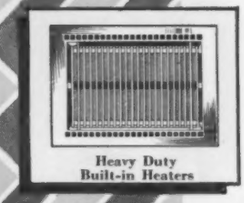
Combination Hotcake and Waffle Iron

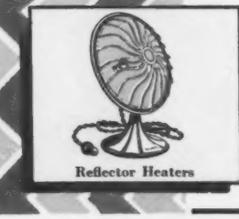
Convenience Outlet Portable Heaters

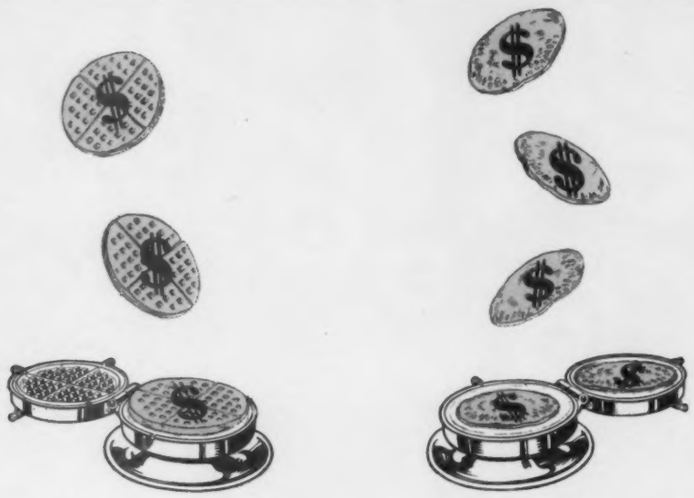
Heavy Duty Portable Heaters

Bracket-type Bathroom Heaters

Built-in Bathroom Heaters


Heavy Duty Built-in Heaters


Reflector Heaters



There's real "Dough" in MAJESTIC Hotcakes and Waffles

The Majestic Combination Hotcake and Waffle Iron is the *best* one made, it's a *best seller* too. And it's the highest priced so you make more per sale, and you make more sales.

From every viewpoint—jobbers', central stations', retailers', and consumers' Majestic is "King of them all"—handsome, durable and convenient; extensively and consistently advertised and a good load-builder.

And—Majestic is the *only* one that makes both hotcakes and waffles.

MAJESTIC

Majestic Electric Appliance Company, Inc.

Kansas City San Francisco Philadelphia

Electrical West entered as second class matter at the post office at San Francisco, under the Act of Congress, March 3, 1879. Published at 883 Mission Street, San Francisco, California, thirteen times a year as follows: January 1, February 1, March 1, April 1, May 1, May 15, June 1, July 1, August 1, September 1, October 1, November 1 and December 1.

AUG 13 1928

©CIB796922

Volume 61 San Francisco, August 1, 1928 Number 2

Electrical West

With which are consolidated the "Electrical Journal," the "Journal of Electricity, Power & Gas," and the "Journal of Electricity"

C. T. HUTCHINSON, *Editorial Director*
W. A. CYR, *Associate Editor*
G. R. HENNINGER, *Associate Editor*

A McGraw-Hill Publication
Established 1887

G. C. TENNEY, *Managing Editor*
E. J. KNOWLTON, *News Editor*
B. H. SNOW, *Northwest Editor*

Contents

Editorial 63

"Literary Efforts" Not Confined to Utilities—What Is Menace to One May Be Menace to All—Colorado River Development Is Still a Dream of the Future—Toronto Consumers Get a "Left-Hand" Rate Reduction—Federal Trade Commission Will Not Investigate Municipal Utilities—Buy Low My Baby—Coffin Award Emphasizes Western Electrical Supremacy—A Public Service Creed That Has Lived Twenty-Five Years.

Shoshone Falls Illuminated 66

Frontispiece.

Capitalizing on County Fair Displays 67

The experiences of four successful Western companies in county fair participation are analyzed and appraised.

Electric Heat Applied Successfully in Producing New Cereal Food 72

By GEORGE BERNHARD.

A discussion of some of the advantages claimed including more uniform heat distribution and better heat regulation.

Alouette Is Canada's Largest Automatic Generating Plant 73

By C. W. COLVIN.

A description of the latest plant in the British Columbia Electric Railway Company's Alouette-Stave-Ruskin project.

Modern Hospital Illumination 76

By LEONARD A. HOBBS.

A discussion of the principles of modern hospital lighting with particular reference to some of the more recently completed Western hospitals.

The Power Industry in the Marketplace 79

By JAMES H. MCGRAW.

The answers to some of the perplexing problems facing the electrical industry particularly in its sales efforts to meet the "new competition."

Text of Northwest Prize-Winning Speech Is Presented 81

Engineering Practice 82

A Sensitive Ground Detector for D.C. Circuits 82
Some Typical Oregon Distribution Substations 83
Control Mechanism in Circulating Line Prevents Back-Flow 84
Unit-Type 33-kv. Rural Switching Center Gives Flexibility With Rigid Economy 85
Analysis of Current Transformer Tests—XIV 86
Voltage Complaints—Causes and Remedies 88

Ideas for the Contractor 90

"Burglar Lights" as Profitable Contractor Business 90
Talking Movies Offer Possibilities 92
Control Features Devised for Safe Operation of Gravel Plant 95
Graded Intensity Effective in Building Floodlighting 96
Estimating Ventilation for Churches and Public Buildings 97

Better Merchandising 98

New Electrical "Mysteries" as Applied to Window Display 98
June Bride Prize Windows 100
No Saturation in Utah 101
Ice Men and Electric Combine 102
Making the Advertising Fit the Town 104

News of the Industry 106
Meetings 113
Contractor, Dealer and Inspector 114
Personals 116
Manufacturer and Distributor 118
New Equipment 120
Industrial Barometer 124

McGRAW-HILL COMPANY OF CALIFORNIA—883 Mission St., SAN FRANCISCO
Northwest Office: 1206 Spalding Building, Portland, Ore.
Publishers of ELECTRICAL WEST

JAMES H. McGRAW, Chairman of the Board
C. T. HUTCHINSON, President
EDGAR KOBAK, Vice-President
ROY N. PHELAN, Secretary and Treasurer

WASHINGTON, Colorado Building
CHICAGO, 7 South Dearborn Street
PHILADELPHIA, 1600 Arch Street
CLEVELAND, 501 Guardian Building
ST. LOUIS, Southwestern Bell Telephone Bldg.
NEW YORK, 285 Madison Avenue

McGRAW-HILL PUBLISHING COMPANY, Inc.
New York
Publishers of

Industrial Engineering — Electrical Merchandising
Chemical and Metallurgical Engineering — Power
American Machinist — Construction Methods
Electrical World — Electric Railway Journal
Coal Age — Engineering and Mining Journal
Bus Transportation — Engineering News-Record
Radio Retailing — Ingenieria International
American Machinist—European Edition
(Published in London)

Member Audit Bureau of Circulations. Associated Business Papers, Inc.
Circulation of this issue, 6,300

Copyright, 1928, by McGraw-Hill Company of California

Subscription rates in United States, Canada, Mexico, Porto Rico, U. S. Possessions, Argentina, Bolivia, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Nicaragua, Panama, Guatemala, Paraguay, Peru, Honduras, Salvador, Uruguay, and Spain, $2.00 per year, 2 years, $3.00. Elsewhere, $3.00 Gold (13 shillings). Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

Entered as second-class matter at the Post Office at San Francisco, under Act of March 3, 1879. Published thirteen times a year as follows: January 1, February 1, March 1, April 1, May 1, May 15, June 1, July 1, August 1, September 1, October 1, November 1, December 1.

Printed in U.S.A.

CHARLES A. COFFIN MEDAL
FOR DISTINGUISHED CONTRIBUTION
TO THE DEVELOPMENT OF ELECTRIC
LIGHT AND POWER FOR THE CONVE-
NIENCE OF THE PUBLIC AND THE
BENEFIT OF THE INDUSTRY
AWARDED TO
PUGET SOUND POWER & LIGHT COMPANY
1927

THE CHARLES A. COFFIN MEDAL
awarded the Puget Sound Power and Light Company, Seattle, Washington. A. W. Leonard, President.

for the

"MOST DISTINGUISHED SERVICE"

to a Great Industry

The Charles A. Coffin Foundation Gold Medal, given annually to the company which has contributed most to the development of electric service, has been awarded for 1927 to the Puget Sound Power and Light Company.

Since the establishment of the fund six years ago, two Stone & Webster Companies, one railway and one light and power, have won the Coffin Award—the highest honor in the industry for excellence of operation.

STONE & WEBSTER

INCORPORATED

OPERATE FINANCE BUILD

Electrical West

With which is consolidated the Journal of Electricity

C. T. HUTCHINSON, *Editorial Director* — A McGRAW-HILL PUBLICATION — G. C. TENNEY, *Managing Editor*

Volume 61 — San Francisco, August 1, 1928 — Number 2

ONE HESITATES to think of the havoc in a Televox operated substation should a fife and drum corps parade outside playing "Yankee Doodle."

THE MYSTERY as to what is necessary to make cows contented apparently has been solved by the United States Department of Agriculture. Dr. E. W. Allen, chief of the department's experimental stations, reports that ultra-violet ray treatments not only produce contentment but improve the quality of the milk. Just give the electrical industry sufficient time and it may produce contented farmers.

THE ORGANIZATION and operation of the Ontario Hydro system has furnished certain saffron-tinted journals with an ideal editorial theme. Those papers that have pointed to the Hydro Commission as a perfect example of government ownership and operation should derive renewed vigor from the editorial in these columns discussing the recent rate increase in Toronto. In fact, the editors might have added to the editorial in question that quaint phrase frequently seen at the bottom of a death notice—"Hearst papers and Sacramento *Bee* please copy."

"MUNICIPAL Electric Light Plants in California Show $10,000,000 Profit in Year," shouts a headline in the Sacramento *Bee*. But in the news copy that follows, the reporter naively adds, "Due to an incomplete system of reporting upon the financial affairs of these city-owned plants, however, Riley (state comptroller) is unable to give data relative to the net earnings of the municipalities." Such absurdities are added reason for early legislation that will force municipally-operated utilities to adopt sound accounting methods that will permit a comparison between costs of service of publicly and privately-owned systems.

"Literary Efforts" Not Confined to Utilities

SURELY we are living in a golden age of "literature." If it took a Federal Trade Commission investigation to reveal it, the revelation is no less amusing in its ramifications. It would seem, moreover, that the literati are not confined entirely to the public utilities. Others have written, too.

The *Cleveland Plain Dealer*—so reports *Editor and Publisher*—determined to perform a public service and find out to what extent utilities and industries were circulating literature of one kind and another among the schools. It unearthed no end of literature. Exciting the school board to assist in the search, the report states, a corps of clerks has been necessary to list and index the thousands of pamphlets dealing with industry which are now being sent to schools. Printed matter describing manufacture or production of food products, wearing apparel, soaps, clocks, rubber, leather, steel, bananas, paper, sugar, lead, glass, lead pencils, flour and what not, has been listed.

There are the stories of—Steel, Sugar, South America, the Banana, Lead Pencils, Glass, Flour, Rubber—a Wonder Story, and Asbestos. There are the romances of Coffee, Time, Silk, and Cotton. There is "The Battle With Bugs," and something about "Hidden Treasure" in breakfast food. "How Paper is Made" vies with "Nothing Takes the Place of Leather." There are the "Makings of Steel Wire," the "Growing of Tea," and odes to butter, malted milk, soaps, certified meats. There are travels in Europe, Siam and Seattle. There are screeds on insurance, olives and cleanliness.

Among this maze of matter the lone offerings of the Electrical League on how to use electricity safely and conveniently are buried. Just why they should have been segregated suddenly from the mass and set up into the spotlight of opprobrium, unless there is some political significance to the entire inquiry, is not easy to discover. Can it be that the "Story of Electricity" is so well written that it leads all the rest? Such a thought is flattering, if nothing else.

It is refreshing to note that E. M. Williams, the superintendent of schools at Cleveland, considers the matter a "tempest in a teapot." Perhaps he typifies the sensible American everywhere, who can see nothing to get so excited over in the fact that various industries, including the electrical, have felt it necessary to supplement condensed and necessarily sketchy textbooks with the detail necessary for a more properly balanced understanding of American industry and development.

What Is Menace to One May Be Menace to All

"AS A NATION we Americans love to be menaced," says Roy W. Howard, a partner with Scripps in the ownership of the Scripps-Howard interconnected, super-newspaper chain, writing in defense of "Mass Newspaper Production" in a recent number of *The North American Review*. "Like poor relations, menaces are something we have with us always. Life would scarcely be complete without them—normalcy would be impossible. And we must have variety, for menaces, those of the sort which threaten our life, liberty and the pursuit of happiness, are ephemeral. Their vogue is for the most part short-lived and styles change. We newspaper men know. The truth compels admission that, by and large, we have been rather frequent menace merchandisers ourselves in times past and present. Now we are by way of being hoist on our own petard."

The latest menace being merchandised by Mr. Howard's news dispensary is that of "the power trust."

It cannot help but be amusing to the "propagandists" of the "power trust" to find this "newspaper trust" using institutional and goodwill advertising to tell of its exploits of public service in which it modestly claims

for itself full credit for many brave reformations and public works; devoting its news columns to self-praise for some of its pet theories and causes, not to mention its circulation and advertising claims and contests; writing magazine articles in defense of holding company ownership in which familiar phrases ring; selling stock to its employees; and committing quite a sizable number of the acts for which it chastises its brother public institution, the power company.

In setting up the menace of government ownership as a threat to the power companies, it is not without the limits of possibility that Mr. Howard is creating a Frankenstein that may prove equally destructive to chain newspaper publishers.

Colorado River Development Is Still a Dream of the Future

AFTER having provided the pyrotechnics that so frequently characterize the sessions of the Senate as adjournment approaches, the Boulder Dam Bill failed of passage but remains as unfinished business with prior rights when Congress convenes in December. Even though given approval by the House, the fate of the measure is still in doubt. In the meantime both houses passed and the president signed a resolution authorizing the Secretary of the Interior to appoint a board of five eminent engineers and geologists to examine the proposed site of the Boulder Dam, review the plans and estimates for the structure, and report before Dec. 1, 1928. The board is to study the safety, the economic and engineering feasibility and adequacy of the proposed dam and incidental works. Furthermore final approval of any plans for the dam will rest with the board.

Thus with Imperial Valley once again in the midst of a period of flood menace we find: (1) the Colorado River Compact six years old and yet to be approved by the seven states involved; (2) an international treaty with Mexico still to be drawn up; (3) the Boulder Dam Bill before Congress for a fourth session; (4) the terms of the bill such that, were all its provisions to be met immediately upon passage, flood control would not be provided until at least five years after construction is started. The only logical conclusion to be reached after a review of this muddled situation is to hope that the prayers of the residents of Imperial Valley will continue to be heard.

Toronto Consumers Get a "Left-Hand" Rate Reduction

APPARENTLY it has been a cold winter in that part of Canada where the far-famed and widely advertised Ontario Hydro system operates. The Hydro Commission has recently ordered a rate increase that seriously affects all the domestic consumers in Toronto who for some years have been enjoying a one-cent residential lighting rate.

Under the new rates the service charge of 3 cents per 100 sq.ft. of floor area remains the same, as does the primary block of 3 kw.-hr. per 100 sq.ft. at 2 cents. The previous low step of the rate has been raised from 1 cent per kw.-hr. to 1½ cents for 6 kw.-hr. per 100 sq.ft., with the further restriction that all energy used in excess of 9 kw.-hr. per 100 sq.ft. is chargeable at 2 cents per kw.hr. There is an allowance to customers having an electric range of an additional 200 kw.-hr. at 1½ cents. On houses of six or seven rooms the increase will average 14 per cent while on larger homes of ten or twelve rooms the increase will be approximately 29 per cent. Where energy is not only used for cooking but for water heating and supplementary air heating the increase will be even greater.

The announcement of the commission intimates that the upward revision of rates has been necessary because domestic consumption has passed the limits of off-peak supply. The commission reports that the "object of the adjustment is not so much to collect more revenue from the customers who are using an amount of power comparable to 1916 as to correct the tendency toward increasing loss which results from larger and larger consumption of excess power sold at a decreasing average rate with an increasing average cost."

The consumer will get little solace or satisfaction from this statement. An inducement type rate has been displaced by one that places a penalty upon increased usage. The inevitable effect of this peculiar rate schedule, which goes down and then up again with an increased load factor, will be the loss of a considerable portion of the heavy-duty domestic load. Such limitation is hardly compatible with the accepted theory of rate making where every inducement is offered to increase utilization and build up the customer's load factor.

Municipal ownership zealots who have pointed to the Ontario system as an ideal pattern to be followed in the United States will have a difficult task in explaining and justifying this recent increase in domestic rates. They will find their job doubly hard in those sections of California where appreciable reductions in domestic rates were recently announced.

Federal Trade Commission Will Not Investigate Municipal Utilities

WHEN Congressman Douglas made his attack upon the Boulder Dam Association before the Federal Trade Commission hearing on May 9 last, it created considerable consternation. As was pointed out in the June 1 issue of ELECTRICAL WEST, he accused the Los Angeles Bureau of Power and Light, acting presumably through the Boulder Dam Association, of expending more than $129,000 up to the year 1925 for influencing public opinion and Congress in favor of Boulder Dam, and expressed the opinion that the actual expenditures to date were more than four times that amount, in addition to gifts of oranges and other fruit to members of Congress.

Then comes the presiding commissioner, who announces that the commission has decided that it is beyond the scope of the inquiry outlined in Senate Resolution 83 to investigate the activities of municipal owners of utilities, or of other corporations or persons than those connected with privately owned utilities.

The matter of jurisdiction or the power to act in the premises is a nice legal question. To a layman it would appear to be delimited by the Senate resolution under which the Federal Trade Commission is acting. Nevertheless if the real purpose of the inquiry is to determine whether or not certain practices are contrary to the public interest one may ask, Why exclude the advocates of municipal ownership?

The Federal Trade Commission would appear to exercise a dual function, as an inquisitorial body similar to a grand jury, and then as a court of justice in trying cases developed by their own inquisitors. If they are to make good in the eyes of the public, there are many who might ask with certain propriety what is the difference between the lobbies of privately owned and municipally owned utilities.

Quite a considerable number of citizens are gaining their livelihood in the employ of municipally owned utilities. They are striving with might and main to

extend the municipal-ownership idea as a means of providing more and better jobs for themselves in their chosen calling, and have banded together in associations of one kind or another for that purpose. Therefore, rather than criticize the action of the Federal Trade Commission in ruling out all evidence of lobbying by municipalities, let Senator Walsh, in the interest of public welfare, amend his famous resolution so that the municipalities may receive a fair share of the attention of Federal Trade Commission investigators, and the taxpayers know more about how their public servants are putting in their time.

Buy Low My Baby

STATISTICIANS tell us that there is a certain slackening in some lines of business, presumably because in these lines manufacturing has caught up with the ability of markets to absorb, and that, therefore, business is "not so good."

Undoubtedly the "economy" bug has bitten quite a number of people. Directors are cracking the whip over the heads of executives; executives are passing the stimulus thus imparted all the way down the line; and behold, one of those things called a "vicious circle" has been created.

The president calls in the sales manager and pounds the desk in emphasis of the insistent demand for greater volume of sales. And then when the sales manager goes out, in comes the purchasing agent, who is instructed preferably to buy nothing and to pay as little as he can for what he does buy, perhaps to go in for sub-standard goods—anything, in fact, to keep expenditures down.

This is the vicious circle: on the one hand, we must sell; on the other hand, we must not buy. A man standing on his own foot is a fountainhead of economic wisdom compared to those who are attempting to enforce such a foolish policy.

When members of the British Trade Commission came to this country to try and understand the apparent contradiction between high wages and low cost, they found that every producer was also a consumer and that low wages did not produce great consuming capacity. Sell much and buy little is as good a policy as any, if hard times are wanted. Perhaps some of our executives have not learned the why and the wherefore of American prosperity and industrial supremacy. If not, it is time they did.

Coffin Award Emphasizes Western Electrical Supremacy

FOR THE second time since the establishment of the Charles A. Coffin Foundation in 1923 a Pacific Coast power company has won the coveted Coffin award for 'distinguished contribution to the development of light and power for the convenience of the public and the benefit of the industry." By winning the 1928 award the Puget Sound Power & Light Company has added further claim to leadership in electrical development that the West established in 1923 when the Southern California Edison Company won the medal.

Outstanding among the records submitted by the Puget Sound Power & Light Company was the progress made in rural electrification, in domestic load-building and in railway electrification. Few utilities can point to such accomplishments as the serving of 64 per cent of the farms in their territory with 3,574 miles of rural lines carrying service to 25,000 farms. Yet in 1927 the company added 3,700 additional farm customers. The low inducement-type rates created for domestic service have resulted in record electric range sales for three successive years with a peak of 8,042 ranges sold last year. Today almost one in four domestic consumers cooks with electricity and the company serves 22,369 ranges. Average domestic consumption increased during 1927 113 kw.-hr., or 17.4 per cent; gross revenue increased 14 per cent; revenue from domestic consumers 21.3 per cent and kilowatt-hour sales to domestic consumers 30.1 per cent.

Other achievements to which the company can point are the furnishing of service to two transcontinental electrified railways, the electrification of every coal mine in its territory and many of the lumber mills and logging camps. Important engineering accomplishments have been the successful design and operation of a fish ladder for lifting salmon over high dams, and the installation and operation of a submarine power transmission system that has created records for capacity, length and depth of water traversed.

In view of the increasing interest taken by the utility companies in competing for the Coffin award, it will be recognized that the high compliment paid to the Puget Sound Power & Light Company is one of unusual character for which the company is to be congratulated.

A Public Service Creed That Has Lived Twenty-Five Years

WHEN he founded, more than a quarter of a century ago, the public utility organization that today bears his name, the late Col. H. M. Byllesby issued instructions to his managers regarding the relations of his employees with the public. Undoubtedly in those days the policies laid down sounded revolutionary and radical, but a mere reading of them indicates that not only have they stood the test of time but that they are as true today as they were twenty-five years ago. Colonel Byllesby's statement follows:

"Deal honestly, fairly and lawfully with all concerned. Make your business and personal character above reproach.

"Your business will be most profitable if you charge the lowest possible rates and develop the largest volume of service.

"Try and set a high standard. Keep the cards on the table. We want no secret deals, no favoritism, no corruption. Sooner or later the people will understand. This course may cause you harder work for a time, but eventually it will make it easier.

"Never forget that your company is a public servant that wants no dollar that it does not earn.

"Take people into your confidence. Give them the facts.

"Treat the people as human beings, realizing that mutual good faith and tolerance form the basis for successful commerce between man and man.

"Participate in the public and semi-public welfare activities of your city.

"Maintain the old-fashioned virtues. They will always win in the long run. We are back of you to the last dollar as long as you do your honest best, but we will not forgive any act that is not clean and honorable."

We can offer no better suggestion than that the industry read and take new faith and inspiration from the declaration of this former leader. His words might even be proposed as a credo for every man and woman in the industry today.

Shoshone Falls Illuminated

RIVALING Niagara Falls in height and beauty, Shoshone Falls on the Snake River in Idaho have been floodlighted by the Idaho Power Company. The installation consists of 30 projectors with a total capacity of more than 25,000,000 candle power. This remarkable view of the falls was taken just at dusk.

Capitalizing on

County Fair Displays

[*The Experiences of Four Successful Companies Surveyed and Appraised*]

Its tent set up for general home appeal displays such as at Nampa.

FOUR methods of handling fair exhibits reveal themselves through an inquiry into the practices of power companies who have made use of such exhibits in a systematic manner. Interwoven within these four handling methods are three types of approach to visiting consumers.

Generalized accounts of county and industrial fair exhibits can be only of minor direct value to executives considering this type of advertising or sales procedure. Specific information as to method, cost, and technique of handling visitors to such exhibits, however, can prove of direct value to any company contemplating fair displays. For this reason direct questions upon these points were asked of four companies whose exhibit procedure best represented the four types of treatment employed. The response from each has been complete, revealing and informative.

Considering the four methods in turn, there are:

1. *Autonomous* or completely independent type. This is represented by the Idaho Power Company, which carries its own show in its own tent, instead of making use of fair building facilities.

To aid the fair visitor to take home data bulletins and pamphlets this shopping bag was provided.

2. *Fixed* or institutional, wherein permanent space is retained in a fair building, and permanent features are built up to last from year to year. This is best exemplified by the Puget Sound Power & Light Company.

3. *Standard* or typical method, where space is rented and display made from year to year as all exhibitors do at fairs. The British Columbia Electric Railway Company is successful in such endeavors.

4. *Portable*, where a display booth is made to be taken apart and set up at each of a number of fairs, using such fair facilities as are available. This method is used by the Valley Electrical Supply Company for the San Joaquin Light & Power Corporation.

The three methods of conducting the fair exhibit itself from the standpoint of approach to those visiting the booth involve: (1) direct selling from the booth, (2) solicitation of prospects only, or (3) making the exhibit purely a matter of good-will building.

Each of the four types mentioned varies in these latter respects, so that a consideration of each one in detail will determine its particular applicability to any local situation.

Serving a scattered farming community, whose annual fairs are great events in the lives of its people, the Idaho Power Company, complying with a request from the Idaho Committee on the Rela-

Two views of the tent interior as set up in agricultural fairs to display all the uses of electricity on the farm, from bug killers to pumping plants.

tion of Electricity to Agriculture, decided in 1927 to make its display in a large tent which could be moved from place to place. These fairs take the form of county fair, grange fair, rodeo, harvest festival, roundup

The tent set up for agricultural display only.

or dairy show, and facilities for display are often lacking. In some places, where fair buildings were used, it was found that the tent was more satisfactory because it aroused curiosity and attracted more people than

An atttendance prize helped to get prospect survey cards filled out.

displays in the buildings. Details of the method of handling the fair exhibits, taken from the official report and from statements of L. W. Brainard, acting sales manager of the company, are interesting.

Men were sent out into the field from the main office to assist the local office organizations to arrange for the displays. Equipment for displays was secured, as far as possible, from local representatives or dealers, such as water systems, hay cutters, milking machines, separators, etc. For home or domestic displays the company's own merchandise was used, all other dealers being asked to occupy part of the space. The idea was to make a complete display of electrical equipment rather than an advertising scheme for the Idaho Power Company.

For distribution two booklets were featured—the progress report of the Idaho Committee on the Relation of Electricity to Agriculture and a current issue of the magazine, Electricity on the Farm. Pamphlets of equipment manufacturers of all kinds also were distributed. To enable visitors to carry home conveniently all this literature paper shopping bags, as shown here, were given away.

After the visitors were given bags they were asked to fill out and sign a registration card. As a further inducement three electrical appliances were given away as prizes. The registration cards were in white and salmon, the white for users of electricity, the salmon for non-users. The users' card gave a list of appliances to which the visitor might check whether "now using" it or "interested in" it.

Other display material consisted of posters made up of pictures of farm uses at the Caldwell state experimental station farm, and N.E.L.A., General Electric Company and other advertising pages. Banners, posters, cards, etc., also were used.

Where dates of fairs overlapped each other, duplicate shows were staged. This was possible because in each instance local merchants, jobbers or manufacturers co-operated. Where co-operation was fullest the displays were the most elaborate. In some fairs the entire exhibit was limited to agricultural uses. At others the display was of domestic applications chiefly, depending upon the nature of the fair, location, and local interests.

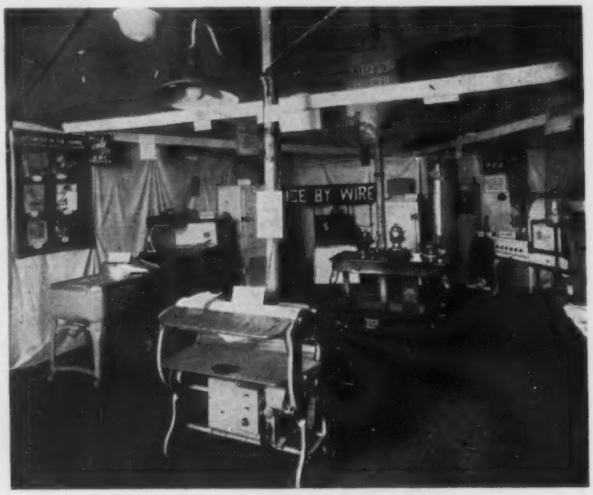
Direct sales were not attempted, although many voluntarily bought articles on display. A great many prospects were secured, however. Of a total registration for the twelve fairs of 6,334, the number of customers of the company was 5,103. The non-users numbered 1,231, of which 387 were checked over and considered as possible new extension prospects.

The customer registrations showed use of and interest in electric service applications as follows:

Electric Service	Now Using	Intrested In
Electric cooking	1,203	370
Water heating	661	106
Washer	2,001	365
Ironing machine	142	154
Refrigerator	92	282
Vacuum cleaner	1,420	308
Iron	2,776	151
Toaster	1,203	203
Percolator	833	229
Waffle iron	722	312
Milking machine	49	54
Separator	100	39
Dairy sterilizing	6	9
Incubator	22	13
Brooder	24	7
Feed grinder	27	19
Water system	124	37
Utility motor	87	16
Other items	69	8

As to the results and conclusions drawn, Mr. Brainard says, "We feel that the fair displays were very much worthwhile and we are planning to make somewhat more elaborate display this fall. Results indicate that goodwill created, extension applications and merchandise sales made will have justified the expense."

The total cost, for the twelve fairs, including labor, preliminary preparation, locating and erecting of the display and personnel in attendance (this item alone $909.05), tent rental, space rental, advertising and decorative material (this item alone $4,099.83), was $5,008.88. Prospect cards were distributed to stores of the company for follow up.



Typical domestic display in the tent.

Observations of those in charge of the displays were:

A tent display draws best, as no neighboring displays divide the visitors' attention.

By lighting and location the B.C. Electric booth dominated the show. Its open sides invited visitors to enter and see demonstrated all appliances.

An attractive display, preferably moving, as of washer or ironer, should be placed in view of the entrance but back far enough to make it necessary to come inside to see it properly. Where displays are too near the entrance the tendency is to look at this one item and pass on without entering.

Once a visitor is inside, aisles for traffic should be so arranged that it is necessary to go through the entire display and out another doorway.

All display advertising should be in large letters and briefly worded.

The Permanent Display

While the Puget Sound Power & Light Company makes a number of exhibits at various county and other fairs in its territory, these ranging from 10 ft. of space upward, it is to its permanent exhibit at the Puyallup fair that chief attention is concentrated. A complete description of this exhibit was given in the May, 1927, ELECTRICAL WEST, pp. 276-7, therefore a brief summaary of this extensive display will suffice here.

This exhibit started with the erection, some years ago, of a model electric home and several farm buildings of permanent construction, occupying one-half of one of the largest buildings at the fair grounds and used each year since. As it stands now the electric model bungalow, roof and all, stands at one corner of the building. Leading up to it is a long series of booths, identified by a standard lattice fence and decorative lattice along the top of the booths. In these booths are displayed equipment for various kinds of agricultural applications—one booth for poultry equipment, one for dairying, another for irrigation, etc. Demonstrators at each booth assist in explaining the applications.

Of this company's fair exhibits J. C. Scott, agricultural expert for the company, says:

We exhibited at some ten different fairs last year, but the nature and size of the exhibits varied greatly. In some fairs we had only 10 ft. of space, while at the Puyallup fair we occupied half of one of the large buildings, our space being about 30 x 130 ft.

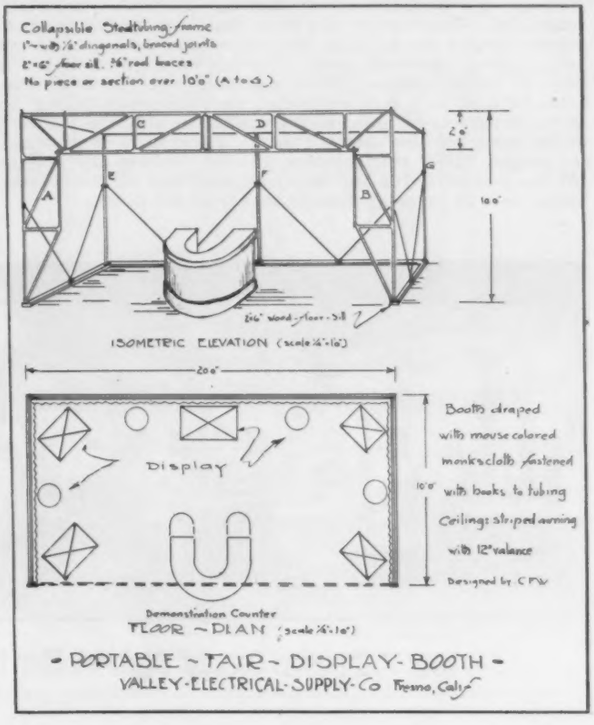
The cost of some of the little fairs was not more than $150, while the cost of the Puyallup fair is spread over a number of years, since we have done considerable structural work which is permanent. The cost for this one particular fair runs about $1,500 a year.

We make absolutely no effort to take orders at these fairs. Our idea of a fair exhibit is that it is nothing more nor less than advertising—putting before the people any new electric appliances and keeping the company's name and activities before the people as much as possible. Sometimes the men get the names of prospects at the fairs but no particular effort is made along this line.

Some of the exhibits are in the nature of household appliances and some of apparatus to be used on the farm outside the home. We have tried to put over two ideas in one booth but unless it is a very large booth and can be divided into two campartments we do not recommend continuing this practice.

The Standard Arrangement

The display of the British Columbia Electric Railway Company at the annual industrial fair in Vancouver, B.C., does not differ greatly in principle from that of the Puget Sound company at Puyallup, since use is made of a particular space each year in the fair building and last year a dome and canopy were built for permanent use. Yet this company's procedure follows more or less conventional fair display practice, namely


Collapsible Steel tubing frame
ISOMETRIC ELEVATION
20'-0"
Display
Booth draped with mouse colored monk's cloth fastened with hooks to tubing
Ceiling: striped awning with 12" valance
Designed by C.P.S.
Demonstration Counter
FLOOR PLAN
- PORTABLE - FAIR - DISPLAY - BOOTH -
VALLEY-ELECTRICAL-SUPPLY-Co Fresno, Calif.

the rental of space, setting up of display facilities, and conforming generally with other fair exhibits.

With this particular company, however, light and color are used lavishly to set its display apart from all the rest. Unlike the two other companies just described, the B.C. Electric makes direct sales from its booth, making the display pay for itself in sales.

The exhibit booth was designed by Ross A. Lort, architect, and erected two years ago in its space, at the center of a large building, occupying 44 x 32 ft. It cost about $2,000 to erect, all work being done by the company's own staff of carpenters under Mr. Young, supervised by the architect. The dome was fashioned of paper, over a framework, and the booth itself of stucco.

The building was lighted by means of coves and inside fixtures. A special feature was made of a display platform at one end on which were shown various small appliances.

Portable fair booth of Valley Electrical Supply Company as set up.

This stage was given a show-window effect, especially as regards lighting, employing mirrored reflectors and screens in three colors, working on a flasher, each color changed about every 20 sec. The floodlights to play on the outside were mounted in the exhibition hall roof. The total lighting load was 3,100 kw. the first year and has been increased since.

It was felt by the company that the booth was financially successful. There were sold from the booth $3,221 in appliances. Orders for 35 home demonstrations were secured and 548 prospects obtained, many of which were closed within 30 days of the exhibition. Four salesmen were in attendance from 10 a.m. to 9 p.m. each day, each salesman taking his turn. Prospects obtained at the exhibition were the property of the salesman who obtained them. There were 68 prospects for ranges, 17 for refrigerators, 127 for washers and ironers, 151 for polishers, 104 for Royal cleaners and 81 for Hoover. There were 21 large appliances sold from the booth.

The idea of using wide spaces all open, instead of fenced in, enabled the placing of appliances right at the front, which proved fundamentally correct in making sales. Particular care was taken not to overcrowd the exhibit, only one model of each type being shown.

A large revolving ball, made of mirrors, and reflecting the roof floodlights, gave this exhibit dominance over all others at the fair.

The Portable Exhibit

Similar in principle to the tent show of the Idaho Power Company, though different in practice, is the portable exhibit employed by the Valley Electrical Supply Company, Fresno. Such a portable booth is used in making displays of home appliances at annual county fairs held at Fresno, Bakersfield, Chowchilla, Santa Maria and San Luis Obispo, Calif., on the systems of the San Joaquin Light & Power Corporation and Midland Counties Public Service Corporation, for which the Valley Electrical is the merchandising subsidiary.

These exhibits are made in addition to the power company's own booth, which itself is unique in principle. The power company usually provides a rest and play room for mothers and their children visiting the fair, a novel and much appreciated feature which inures to good feeling toward the power company.

In his report embodying a budget of expenditures and of sales quotas, H. H. Courtright, manager, describes the method employed in these words:

The size of the exhibit will be governed by the number of consumers in the district; at the smaller fairs the portable booth will be used to house the enire exhibit. (Details of the booth may be gained from the illustrations.) In Fresno and Bakersfield the booth will be used as a center around which to build the larger and more varied display. This year, at Bakersfield we will utilize for the first time a new and striking canopy of striped awning material with the display centering on four refrigerators under its main center supports.

In every case we shall provide attendants in sufficient number to give full and courteous attention to every visitor. In addition to our own and the power company's salesmen we expect to utilize the services of our local dealer-distributors, as well as of the representatives of the electrical jobbing and manufacturing companies.

Our reasons for participating actively in the various fairs are manifold, the chief one being that at these festivals better than anywhere else we can meet a large number of the power company's domestic consumers, thereby obtaining and consolidating their good-will. Furthermore, the public comes to the fairs in a receptive mood and many a deal is closed as a result of the actual demonstration of the appliance, the purchase of which had been for some time a matter of discussion between members of the household.

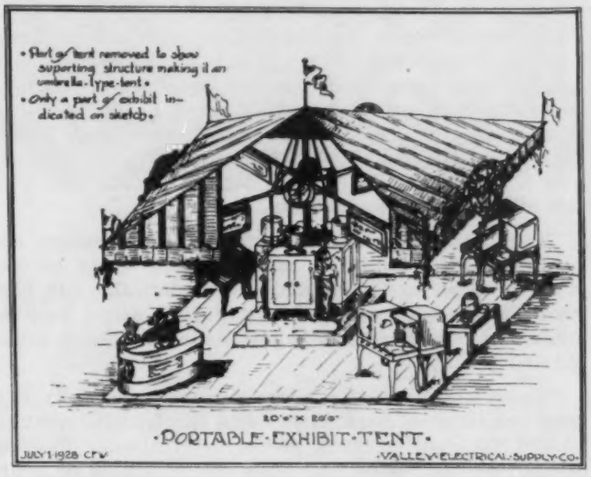
To present a clear picture of the cost of participation a budget has been worked out as to anticipated attendance (based on actual count in former years), unit costs, as well as

1927 Fresno County District Fair Exhibit of Valley Electrical Supply Co.

amounts of actual business needed to liquidate the total expense and the amount of business we have set as a bogey for actual closing at each fair.

This, I believe, is a new and progressive thought. Most firms content themselves with the benefit derived from the showing of their wares and presentation of their names to the public. We have gone a step farther and will make an earnest attempt at making the fairs pay their way. The man in charge of each exhibit will know what is expected of him in the way of actual sales, hour by hour, and thus will take a greater interest in the financial success of the exhibit.

The expenses are listed and main items substantiated from past experience. Even the salaries of our regular salesmen temporarily engaged in fair work have been charged against


• Part of tent removed to show supporting structure making it an umbrella-type tent •
• Only a part of exhibit indicated on sketch •
20'-0" x 20'-0"
·PORTABLE·EXHIBIT·TENT·
JULY 1 1928 CFW
·VALLEY·ELECTRICAL·SUPPLY·CO·

these shows under the assumption that were they not working at the fair they would be engaged in actual productive selling work.

A summary of the total fair expense, and one for just the major exhibit at Fresno, which shows in what detail the expenses have been worked out, are given below:

The "details 1, 2 and 3" referred to, break down in further detail every item comprising these sums. In the salary item the portion of each employee's salary applicable to the fair is listed; in transportation mileage is estimated and limited; in meals maximum per meal is set per employee chargeable to the fair exhibit. The same sort of budget was worked out intricately for each fair.

Special Attractions

Mr. Courtright applies a technique of his own to the art of display, the prime element of which is surprise. "We always have some feature to attract attention," he says, "such as a huge model of an electric iron, vacuum cleaner or toaster, something out of all proportion to its normal size. This arouses interest and curiosity.

"Another feature we always try to have is some delicacy to give away. Last year we gave away thousands of grapes frozen solid in the electric refrigerators. People flock to the booth to get these as the word gets spread around.

"Our sales people are instructed never to stand in front of a table displaying an appliance, always behind it. In front we have found they drive people away, for they fear to be handed tickets or literature. Standing behind a display to demonstrate the appliance works much better. Lots of room around each table is best too, so that many can crowd around to see.

"Another principle used is to display for the first time some entirely new appliance, just developed or unusual in operation. The corn popper served in this capacity one year, the automatic toaster another."

Attention to the booth itself is gained first by superior lighting, so brightly illuminated that all other displays are pale in comparison. Then the factor of not too rich an atmosphere, nor yet to flimsy or cheap, but just attractive and inviting, comes next, with no railing in front.

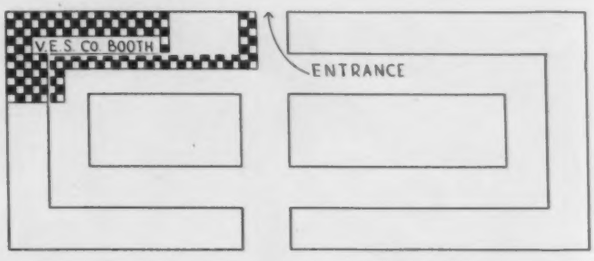
But the stunt which worked psychologically to draw

	Fresno	Bakersfield	Chowchilla	Santa Maria	San L. Obispo	Total
Total expense	$1,036.72	$ 714.96	$ 190.96	$ 448.14	$ 327.49	$ 2,718.27
Days showing	6	5	3	5	3	22
Hours showing	72	60	36	60	36	264
Anticipated attendance	130,000	40,000	6,000	15,000	15,000	206,000
Average cost per visitor	.0797	.179	.3183	.2988	.2183	.132
Average cost per fair-hour	$ 14.40	$ 11.92	$ 5.30	$ 7.47	$ 9.10	$ 10.30
Amount of sales needed to balance expense	3,110.16	2,144.88	572.88	1,344.42	982.47	8,154.81
Amount of hourly sales to balance expense	43.20	33.76	15.90	22.41	27.30	
Amount of sales budgeted for closing at fairs	6,500.00	4,500.00	1,250.00	2,750.00	2,000.00	17,000.00

FRESNO COUNTY FAIR—FRESNO

Sept. 25-30, inclusive.

Booth space rent	$ 215.00	
Wall board and lumber	25.00	
Repainting booth	25.00	
Wiring booth	50.00	
Decorations	25.00	
Drayage, transfer company	60.00	
Drayage, our truck	15.00	
Miscellaneous expenses (insurance, etc.)	25.00	
Demonstration expenses	20.00	
Salaries, as per detail No. 1	468.00	
Mileage, as per detail No. 2	41.52	
Meals, as per detail No. 3	67.20	
Total fair expense		$1,036.72
Days of display	6	
Hours of display per day	12	
Total hours of display	72	
Total budgeted expense	$1,036.72	
Budgeted hourly expense	14.40	
Anticipated attendance	130,000	
Budgeted expense per visitor	.0797	
Amount of sales needed to balance total expense		$3,110.16
Amount of hourly sales needed to balance hourly expense		43.20
Amount of sales budgeted for closing at fair booth		6,500.00



Checked floor from the building entranceway led visitors unconsciously around to the Valley booth occupying the entire corner.

everyone entering the building to this company's booth, was that of the checked floor. The entire floor of the booth was painted in large squares in two colors. Permission was obtained to extend this squared effect

along half the aisle to the door, as shown in an accompanying diagram. In this way, everyone entering the door was attracted to walk on the squared-off floor, follow it around the first booth at the door and into the Valley Electrical Supply Company's large display at the corner, which was all tied together by the same floor design.

Electric Heat Applied Successfully in Producing New Cereal Food

Some of the Advantages Claimed Include More Uniform Heat Distribution and Better Heat Regulation

By George Bernhard

Industrial Heating Engineer, Great Western Power Company of California, San Francisco.

THE FIELD for the application of electric heat is practically unlimited. Almost every industrial plant offers possibilities for its application. Another use for electric heat has been found in the Albers Bros. Milling Company's plant at Oakland, Calif. It is employed in toasting cracked or coarsely ground wheat and exhaustive tests and experiments clearly show its advantages.

There are four machines which consist of revolving cylinders 20 in. in diameter and 6 ft. in length, mounted on suitable frames, geared and belted to a motor-driven line shaft. The heating equipment, designed and installed by H. Wesley Hicks, consists of ten 2-kw. strip units for each machine. These are evenly distributed around the outer surface of the cylinder and riveted securely. Two-heat control is provided and connections to the 220-volt feeder are made through specially designed collector rings. These are mounted on the axis at one end of the cylinder. Suitable insulating material is held in place by a galvanized iron shell which surrounds the cylinder.

The operation of the roasting machines and an idea of the product are described by E. W. Kelner, plant superintendent, as follows:

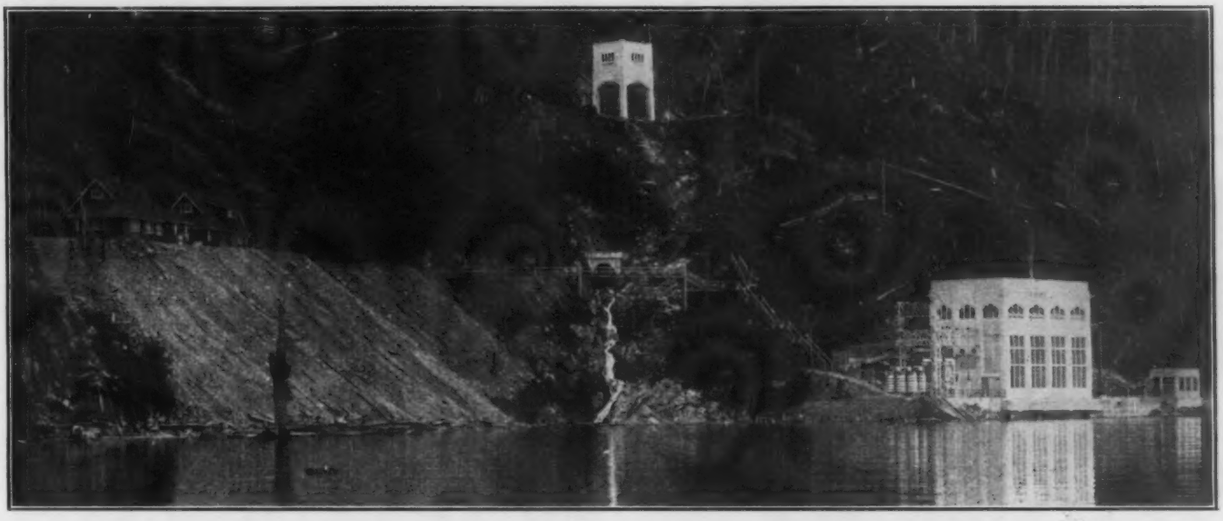
"Barnes Toasted Wheat, the finished product, is a whole-wheat cereal, made from whole recleaned California-Sonora. Approximately 200 lb. of the product is loaded into each of the four rosters and they are revolved approximately 2 min. before turning on the heat.

"When turning on full heat, 20 kw. is applied for ten minutes. It is then reduced to 10 kw. and each roaster revolved slowly, resulting in a slow cooking or roasting effect on the wheat product. The attendant tests the product with a long "tryer" in a tube in the end of the roaster from which the steam or excess moisture escapes. A brown roasted color and flavor indicate when the process is completed. With the electric heat evenly distributed, we find that the time required does not vary over a minute or two for each batch, the total time consumed being 1 hr. and 20 min.

"The heat is then turned off, and the roasters are revolved approximately 5 min. to allow them to cool slightly. They are then dumped automatically into hoppers. The toasted product runs through a reel, then to an automatic scale and package machine for filling, labeling and sealing.

"We find that one of the advantages of electricity is a more uniform heat, applied with proper distribution around the roaster, thus producing a cleaner finished product for the reason that there is no burning or scale. This is very essential in the manufacture and production of our cereal products. The toasted wheat also has a uniform color and the attendant experiences no trouble with the heat regulation during the toasting process. With some heat applications this is a serious problem. The fire hazard is reduced to a minimum and a much cleaner and more efficient operating room is maintained."

Three electrically-heated cereal roasters at Albers plant at Oakland, Calif., (cover raised on one to show heating units).



Alouette automatic hydro-electric plant, the British Columbia Electric Railway Company's newest generating station.

Alouette Is Canada's Largest Automatic Hydro-electric Generating Plant

By C. W. Colvin

Electrical Assistant Engineer, British Columbia Electric Railway Company, Ltd., Vancouver, B.C.

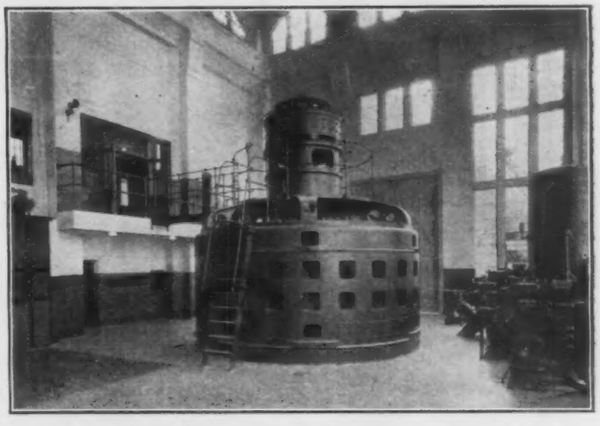
COMPLETION of the Alouette automatic hydro-electric plant marks the second step toward the realization of the British Columbia Electric Railway Company's Alouette-Stave-Ruskin project. The station was placed in operation May 23, 1928, and gives to the company the distinction of now operating the largest fully automatic hydro-electric generating plant in Canada.

The first major step in the above mentioned project was the Stave Falls plant, which was finally completed some two years ago. (See *Journal of Electricity*, March 1, 1926, p. 173.) The Stave development also included the water development at Alouette Lakes. The third unit of this project will be the Ruskin dam and power house, which will be located about 3½ miles downstream from Stave Falls, about 22 miles east of Vancouver.

The Alouette plant itself is located on the shores of Stave Lake about 10½ miles north of the Stave Falls plant. It draws its water supply from the head of Alouette Lake and discharges into Stave Lake, whence its water is used again through the Stave Falls plant. The watershed serving the Alouette plant is estimated at about 80 sq. miles, which provides a measured dependable flow for power purposes of some 700 sec.-ft., 90.2 per cent of the mean annual flow. The usable storage capacity created by the Alouette dam is about 170,000 acre-ft.

Through the narrow ridge separating Alouette Lakes from Stave Lake a 3,500-ft., 12 x 16-ft. tunnel was constructed terminating in the combined valve chamber and surge shaft on the hill behind and above the power house building. From this surge tank emerge the penstock tunnel and a by-pass tunnel. The penstock itself is quite short, its upper portion being of reinforced concrete 13 ft. in inside diameter, while the lower portion is a riveted steel pipe 12 ft. in diameter.

The power house building itself is a reinforced concrete structure and contains the single generator unit together with all of the related control and auxiliary equipment and machinery with the exception of the high-tension switching and protective equipment, which is located outdoors. A 60-ton crane serves the main operating room, and openings through the operating floor permit the crane to be used also in handling the runner and heavy equipment in connection with the

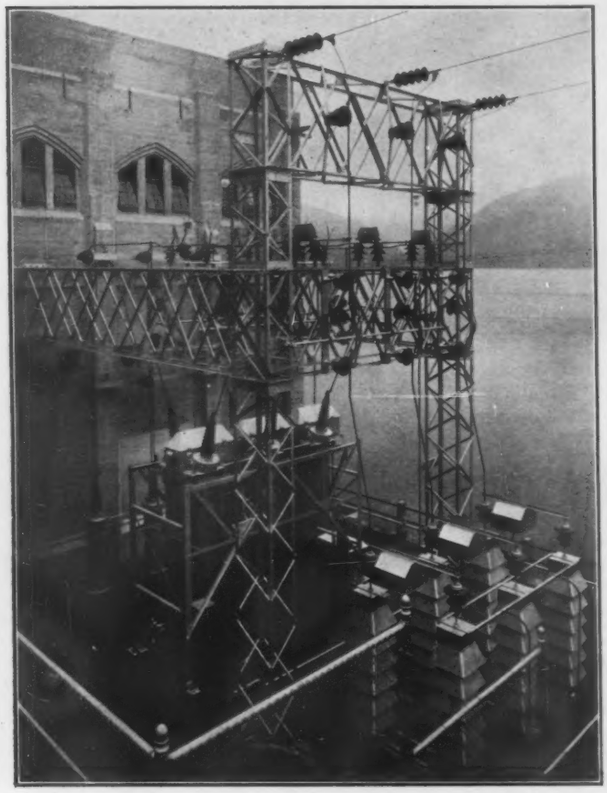


Generator room, Alouette plant.

turbine. Aside from minor soil stripping all excavation for the building, draft tube and the machine foundations was in solid rock.

The main turbine is a vertical shaft waterwheel of the Francis type developing 12,500 hp. effective ouput at 200 r.p.m. and under 125.5 ft. net effective head. The

portion of the draft tube immediately adjacent to the runner is of cast iron while immediately below this is a steel plate conical section made in halves, one of which is solidly embedded in the concrete while the other is removable to provide for dismantling the runner. A gallery extends from the removable section to an open-



Outdoor high-tension switch rack, Alouette plant.

ing in the floor above so that the runner may be handled by the station crane. Below this steel plate section the draft tube is of concrete.

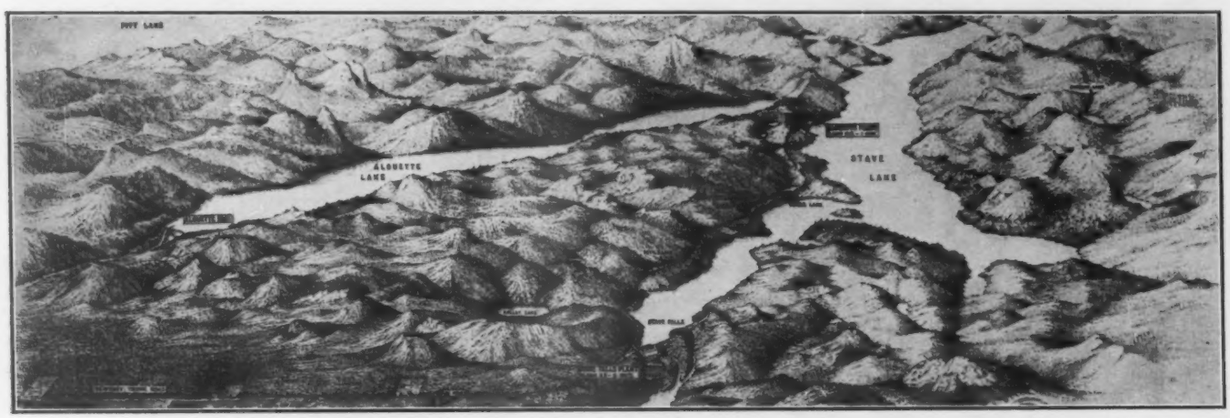
The main control valve is of the cylindrical, balanced type. It is 15 ft. long with a maximum body diameter of 14 ft. 6 in. and has an inlet and outlet diameter of 12 ft. and 8 ft. respectively. It is hydraulically operated through remote control and is arranged also for local hand control.

The generator itself is rated at 10,000 kva., 80 per cent power factor, 6,825-7,500 volts, 3 phase, 60 cycles, 200 r.p.m. Automatic air brakes are provided to bring the rotor quickly to a stop upon all occasions of shutdown. Two 119-kw., 250-volt exciters are provided, one mounted directly on the generator shaft and the other mounted elsewhere in the building and driven independently by a small waterwheel.

The control equipment is of more than passing interest since it provides for the functioning of what is at the present time the largest automatic hydro-electric generating station in Canada and the second largest automatic unit of record. The equipment is designed to perform automatically and in the proper sequence all of the operations of starting, running and shutting down. The protective devices usually found in a manually operated station of course are in evidence at Alouette, but necessarily there are additional protective devices to care for irregularities of operation and for emergency conditions that would be handled by the operator and the floor man in an attended station. Provision is made for starting and synchronizing manually should a condition arise which would make this method of operation necessary or desirable.

When it is desired to start the Alouette generator the operator at Stave Falls 10½ miles away gives the starting signal by simply closing the high-tension oil circuit breaker at Stave Falls which energizes the Alouette-Stave Falls transmission line. Energy thus is made available to the line side of the main low-tension or alternator oil circuit breaker at Alouette which sets in operation a train of automatic devices which under normal conditions will place the generator on the line without further control impulses. The alternator voltage builds up under the control of an automatic regulator and as it nears normal value the automatic synchronizing equipment comes into play which controls, through the governor, the speed of the alternator, and when conditions of frequency, voltage and phase relations are correct, the alternator is connected automatically to the transmission system. Then the alternator assumes load in accordance with the governor setting and with its voltage under the control of the automatic voltage regulator.

The shut-down signal is given to the Alouette automatic station by opening the previously mentioned high-tension oil circuit breaker at Stave Falls. The removal of load causes the unit to speed up with a consequent momentary rise in voltage and frequency resulting in

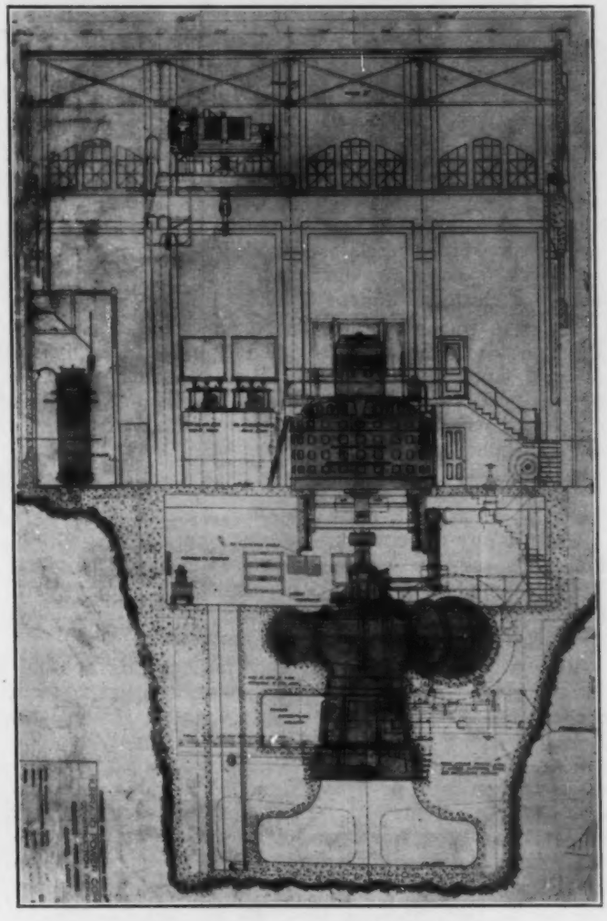


Topographic panorama showing physical relationship between Alouette and Stave Falls power developments of the British Columbia Electric Railway Company, Ltd.. The Ruskin project, the third unit in this group development, is downstream from the Stave plant, Stave spilling directly into the forebay lake of the proposed Ruskin plant which will discharge practically directly into the Fraser River.

the response of overvoltage and overfrequency relays, which set into operation the shut-down sequence of control equipment.

A comprehensive system of protective devices prevents possible damage to station equipment in the event of abnormal conditions. The station will shut down automatically in the event of failure of governor oil pressure or lubricating oil supply, undue heat in either transformer or alternator windings, accidental application of brakes, failure of excitation, overspeed, overvoltage or frequency, underfrequency, or sustained overload or underload. Certain of these conditions will result in only a temporary shutdown and operation will resume automatically when the conditions again become normal, while others will cause a lockout requiring attendance before the station may be operated again. Of course there are other protective features which space does not permit mention of.

The station will not start if a line conductor is broken, if a phase reversal has been made, if the brakes have failed to release, if the governor oil pressure is less than a predetermined value, if the lubricating oil supply fails to build up within a specified time, if the

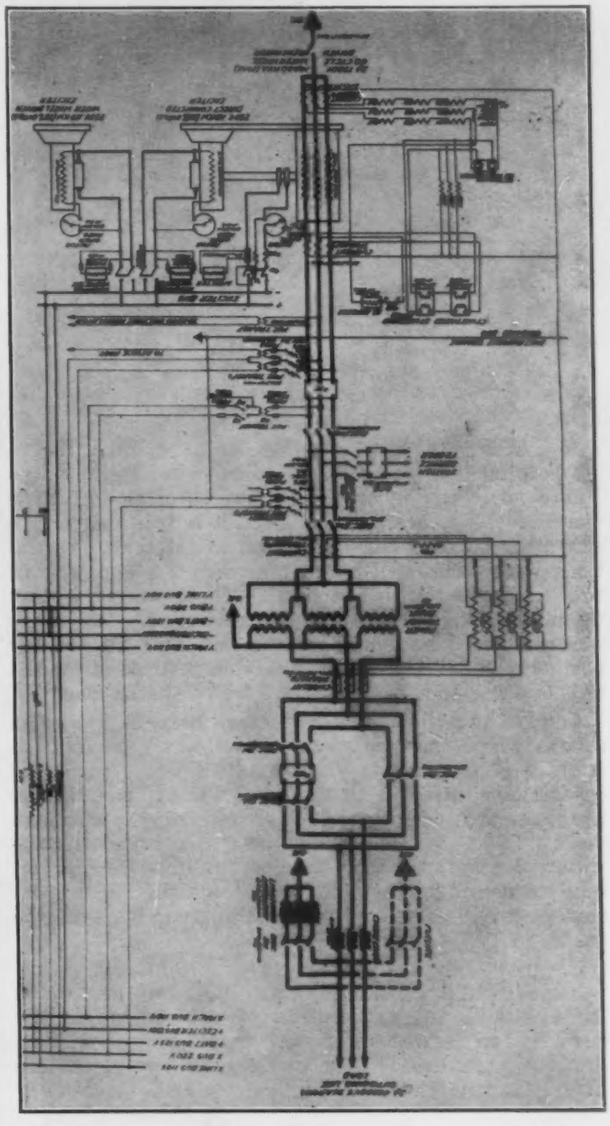


Longitudinal section through Alouette plant.

proper operating sequence of the various devices is interrupted, or if synchronization is not accomplished within a predetermined limit of time.

The element of time involved in the performance of certain functions may be of interest. Head, amount of load and conditions on the transmission system influence the speed of operation of some of the control combinations and consequently the values given in the following tabulation are average times in each case and are taken from the instant of giving the starting or stopping signal.

Complete opening of main valve	70	sec.
First movement of main unit	90	sec.
Synchronization	3½	min.
Full load	10	min.
Shutdown ready for next start	2¼	min.



Portion of elementary wiring diagram, Alouette plant.

The design and supervision of construction were carried out by the company's construction and engineering staff under the direction of E. E. Carpenter, consulting engineer. Excavation for and construction of station buildings were carried out by the Northern Construction Company and J. W. Stewart. The hydraulic equipment, alternator and exciter were supplied by the English Electric Company. The transformers, switching and control equipment were supplied by the Canadian General Electric Company. All installation was done by the British Columbia Electric Railway Company, Ltd.

Modern Hospital Illumination

By Leonard A. Hobbs

Pacific Coast Sales Manager, Edwin F. Guth Company.

A discussion of the principles of modern hospital illumination with particular reference to some of the more recently completed Western hospitals.

Major operating room at St. Joseph's Hospital, San Francisco, where an intensity of 100 ft.-candles is produced through indirect lighting.

IT SEEMS to be the consensus of opinion that a hospital is a place of last resort to send people who are hopelessly ill or for serious surgical operations —a place where everyone suffers. It is true that only a few years ago we had no general anæsthetics. Operations were performed without anæsthetics and wounds were cauterized with hot irons. Those were the days when "bleeding" was a popular cure-all and the work was performed by a barber (the red and white barber pole of today signified the profession of those days, the red denoting the blood, and the white the bandage).

Contrasted with this is the modern hospital, more like a hotel where one may go for a rest or for observation if there be occasion to suspect an ailment. There are departments directed to diet, fluoroscopy, metabolism, hydro-therapy, deep therapy, electro-therapy, and others which make it possible to diagnose a case and treat it with the assurance that if taken in time the ailment rarely causes a fatality; in fact the death rate in most modern hospitals is lower than the death rate of the average city.

Electricity plays an extremely important part in the modern hospital, especially electric light, without which there could not be modern surgery to the extent we now know it, nor could there be the comfort for the patients that they now have. It is with the subject of modern hospital illumination that this article deals.

Hospital Kitchen

The kitchen and storage spaces, not unlike similar rooms in a hotel or club, should not be ignored from the illuminating standpoint, for the primary object of light or illumination is to satisfy vision, and the efficiency of vision will depend entirely upon the quantity and quality of the light. To assure accuracy and cleanliness the kitchen should have an abundance of diffused light. We say diffused because unless light is properly diffused and controlled there will be harsh shadows and glare that will defeat the purpose of an abundance of light.

Where the kitchen ceiling is high it is necessary to suspend the fixtures to obtain proper distribution and efficiency, so a light directing type of equipment, arranged to allow some of the light to reach the ceiling and thereby improve the appearance of the lighted room, is best. The fixture should be the glass enclosing type with white porcelain enameled reflector, suspended on a white porcelain enameled solid stem pendant to assure a clean permanent finish.

As it is important that there be exceptionally good light on the range there should be placed in each hood 50-watt lamps on 4-ft. centers behind which has been placed the full length of the hood a fired white porcelain enameled strip about 12 in. wide and shaped to the curve of the hood. This will increase the efficiency of the lamps.

X-Ray Rooms

The X-Ray department, on account of the high-frequency current employed, requires special treatment. This department in the larger hospitals is composed of different rooms in which fluoroscopic, radiographic, deep therapy and cystoscopic work is performed.

Here we have two problems, one mechanical, the other illuminating. The aerials which are suspended from the ceilings carry high-frequency current. Therefore, it is hazardous to place any lighting equipment on the ceiling, so the use of bracket lights is necessary. The next problem is to produce a form of illumination from these brackets that will exclude the light source from the vision of the Roentgenologist, for if the eyes are subjected to a bright light it is necessary for them to become adapted to darkness before it is possible to get a clear view on the fluoroscope.

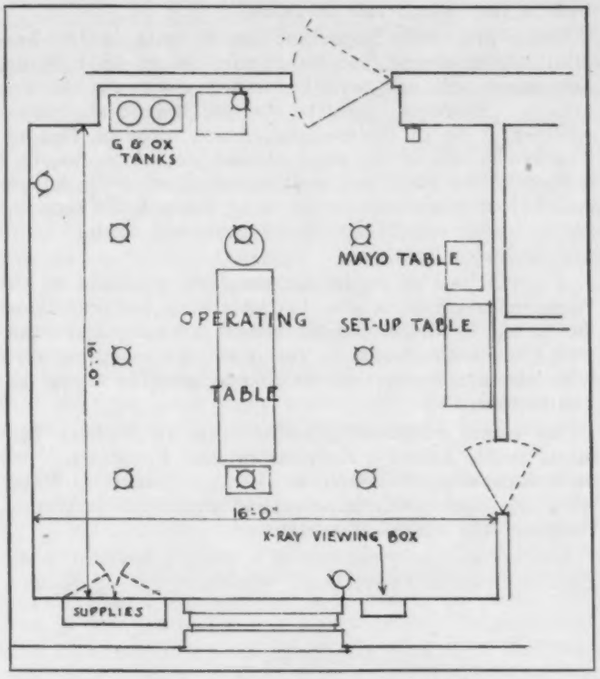
To accomplish this there has been developed an indirect bracket light that fits into the corner of the room, and through the use of special reflectors directs the light to the ceiling, producing a soft indirect light which largely eliminates the loss of time in adapting the eyes of the Roentgenologist to darkness.

The patient's room should be given special consideration as to comfort and appearance. The eye consumes a large portion of the nerve energy. Consequently, a

bright light suspended in the center of the room causes glare and irritation to the patient who must lie and face it; yet without sufficient light a room appears dismal and depressing. A good light is also important for the use of the doctor in examining the patient. It is an easy matter to eliminate the ceiling fixture but this necessitates the use of brackets which can seldom be depended upon to give good general illumination in any room and usually are the source of much glare and discomfort.

After trying numerous styles of indirect and semi-indirect fixtures, it has been determined finally that the most satisfactory equipment is a totally indirect fixture suspended from the ceiling, the reflector of which is made of Armco iron, porcelain enameled, white inside and old ivory outside. The reflector is supported by three supporting members hooked into an adjustable ring threaded onto a special fixture supporting socket and the fixture is hung from the ceiling on a solid ivory-finished metal stem.

From tests it has been found that the white porcelain



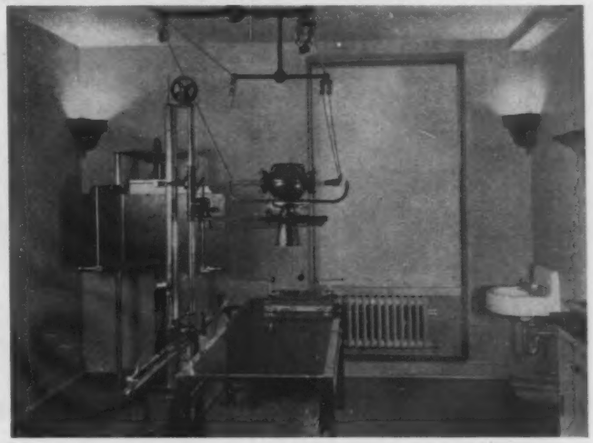
Layout of lighting for major operating room, St. Joseph's Hospital, San Francisco.

enamel makes an excellent diffusing and reflecting surface with an efficiency of about 80 per cent and that it is ideal from a cleaning standpoint. The means of supporting the bowl permits it to be cleaned by unhooking any one of the three supports which allows the bowl to drop on one side so that it can either be dusted or washed with little effort. In fact, several of these fixtures can be cleaned in the time required to clean one glass enclosing fixture, and with none of the customary hazards of breakage.

The adjustable feature permits the adjustment of the reflector in relation to the lamp filament so as to obtain the proper light cutoff, which is important in obtaining the most favorable appearance for the lighted room.

Over the head of each bed there should be placed a bracket light embodying a night light. It may be a surface type made of steel and porcelain-enameled old ivory, or it may be a flush type attached to a two-gang tandem switch outlet box. But in either case, the fixture should embody a night light mounted just above the shade of the reading light. This may be controlled by a levolier switch in the fixture or by an additional switch at the door.

The lamp used in the night light is the 2-cp., 120-volt, frosted, candelabra-base type, and if care is given to selecting a good grade there will be few burn-outs.



Radiographic and X-Ray room, Peralta Hospital, Oakland, showing lighting with brackets.

The reading light is equipped with an opal glass shade of the half-eye type, held in place by a threaded metal ring inside the neck of the shade. It is operated by a pull-cord extension dropped over the head of the bed so that it may be controlled by the patient. This light will furnish an excellent reading light and is far enough back of the head so that no glare or direct light will strike the patient's eyes.

The advantages of brackets as described above for use in patients' rooms are numerous, but perhaps the greatest is in the saving of steps for the floor nurse who would be required to go to the patient's room and turn the light off or on as desired if it were not for this arrangement. The night light feature also does away with the hazardous custom of tying a paper or towel over the reading light.

Typical patient's room at Peralta Hospital, Oakland, showing lighting fixtures used.

This room illumination also eliminates the use of table lamps or lamps that clamp on the bed. These lamps are impractical, the table lamp for the reason that the bedside table is too small to accommodate the numerous articles that are piled on it and consequently the lamp

is continually being knocked to the floor, and the clamp-on lamp is dangerous in that it is easy for it to become grounded on the bed. A patient touching the lamp or the metal part of the bed and reaching for the telephone may get an electric shock that would prove serious.

In the matter of finish in patients' rooms, old ivory has been mentioned. It has been found that ivory is a color that will harmonize best with wall finishes and has

Ward lighting at St. Joseph's Hospital, San Francisco. Night light may be noted at right of bureau near floor line.

a tendency to take on the color of other finishes such as greens, pinks, etc.; consequently, it has proved to be the most satisfactory.

In wards where the night light over the bed of one patient would be in the line of vision of and thus annoy another patient, the night light feature in the wall brackets is omitted and a special light placed in the wall about 12 in. from the floor. This gives sufficient light for the nurse to see to get around the room and observe the patients without disturbing them.

In the nurseries the same night light system is carried out as in the wards, and while we are on the subject of nurseries it may be well to stress the importance of indirect lighting for every room of this department in order to protect the eyes of the children. This should even be carried to the babies' bath.

Operating Room

Operating room illumination is a much discussed subject and many types of equipment have been submitted. The type that is most practical will depend largely upon the arrangement of the room. If the room has a skylight, a direct lighting, multiple lamp, skeleton type unit should be used in order not to obstruct the daylight coming through the skylight. However, operations are not always performed in daylight and even when they are the light varies during the day and is also dependent upon the weather. Consequently, modern hospitals are being built without skylights and artificial illumination is replacing daylight.

Different types of illumination have been experimented with and the most satisfactory form seems to be that of flooding the room with an intense light of 100 ft.-candles or more. This has been accomplished by using several indirect units similar to those used in the patients' rooms, which direct all light to a mat white ceiling, the result being a shadowless light comparable to a light which might be obtained by day through a ceiling made entirely of glass.

An important advantage in this form of illumination, in addition to the absence of shadows, is the lack of heat which is usually present where a spot light is focused on the patient, which not only raises the temperature in the incision and dries out the tissues, but produces no small annoyance to the surgeon who must work with heat from the light projected on his head.

The placing of these units is in the form of a square with no fixture in the center of the room over the operating table, the idea being to have a clean ceiling over the table so that there will be no chance of any foreign matter being jarred down from a fixture onto the field of operation.

While the light produced in the manner described is satisfactory for 90 per cent of operations, it may be advisable for extremely deep operations to have handy a portable spot light. However, its use should be avoided as far as possible owing to the heat rays produced, which generally are conceded to be detrimental.

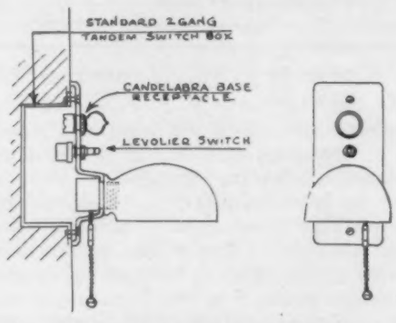
In connection with the heat projected from direct operating lighting equipment, a new heat filter has been announced for use on the "Noshadowlite" that has been used extensively by the Mayos and has been the standard of the United States Government. This heat filter is in the form of two glass disks that filter out the infra-red rays and permit the visable rays to pass with a very small loss of light.

There are other important departments in the hospital which should receive careful study in lighting, but space will not permit further discussion in this article. However, lighting is an important matter whether it be in the hospital, home, office or factory. The eye is one of the most abused, yet abuse-resisting organs of the body, and considering that nearly 90 per cent of our knowledge comes to us through the sense of vision, these organs should be protected against glare and unshaded light.

A great deal of credit for the high standard of the Western hospitals is due to the ability and efforts of Dr. R. G. Brodrick, superintendent of Lane and Stanford University Hospitals, for it is his consulting work with the architects that has made possible these fine institutions.

One recent outstanding achievement in Western hospitals is St. Joseph's Hospital in San Francisco. The architects were Bakewell & Brown; Leland & Haley were the electrical engineers and the Goodwin-Wright Company the electrical contractor.

Another excellent example of a modern hospital is the Peraita Hospital in Oakland. On this building Reed &



Detail of bracket light embodying a night light of the type recommended to be placed over patients' beds.

Carlett were the architects, Simonson & St. John the electrical engineers and Kenyon Electric Company the electrical contractor.

The new addition to the Children's Hospital in San Francisco also will be ultra modern. The architects on this building are Bakewell & Brown, the electrical engineers Hunter & Hudson and the electrical contractor the Turner Company.

The Power Industry in the Marketplace

By JAMES H. McGRAW*
President McGraw-Hill Publishing Company, Inc.

MUCH has been said and written about the need for more energetic methods of market development in the power industry. This is generally admitted. There is no point in my expanding this statement. But it happens also that it does not rest within the control of the power industry to delay action in this matter. For conditions are changing in the marketplace and the power company, that up to now has borne a charmed life because of the natural popularity of its production, is beginning to face and feel the opposition of an aggressive and resourceful competition.

I refer to the growing organized intercompetition between industries that is coming to be called the "new competition." And I submit to you that in future the sale of electrical energy and electrical equipment in the American market is going to depend less upon whether or not people should use the service. It will depend more upon whether or not they elect to spend those dollars for electricity or for something else which at the moment may have greater appeal.

CAN the power industry expect to compete in the marketplace with an advertising appropriation of approximately three-tenths of one per cent of its gross revenue? Mr. McGraw answers this and many other questions regarding the electrical industry's selling problems in the face of the "new competition."

For this new competition is itself engendering a new general philosophy of selection. It is teaching the public to discriminate—not necessarily as to what may be best, but what is most desirable. And just as we have come to learn that we cannot buy all the magazines on the news-stand, so America is beginning to realize that it must plan its purchasing more carefully because selection is becoming more difficult and because of the more deliberate process of modern easy payment buying.

The prevailing question today has become whether to apply available money to something electrical or to an automobile, a radio, a phonograph, a camera, furniture, clothing, shrubbery, or a more extended vacation. This mental attitude, as you know, has not been the outcome of accident. It is the result of ingenious and highly organized sales activity.

INDIFFERENCE TO ELECTRICITY

At the present time in the neighborhood of 108 industries are engaged in concerted programs of co-operative promotion for the purpose of strengthening their positions in the marketplace, by securing the attention and developing the interests of the public. Almost every item of the family budget is now subject to the influence of these campaigns and they are effecting some remarkable changes in the relative sales of different groups of manufacturers. The walnut furniture manufacturers, the copper and brass producers, the paint manufacturers, the laundries, the florists, the icemen and all the rest of them are appealing and arguing for a larger share of that universal lodestone, the consumer's dollar.

And while this is all happening, gentlemen, while the American public is lending its ear to these ably presented messages of personal interest and is reacting to the influence of these suggestions, what does it hear and what does it care about electric service? To put it bluntly, if I may, while so many of these other branches of industry have been so actively and cleverly holding the attention of the people, the electrical industry has stood, not mute in the marketplace, but it has not made itself interesting. And when it has talked it has talked too often about itself.

Men and women are busy with their own affairs and they have not been bothering their heads about electricity all these years. The romance of our great industrial development, its spectacular financial expansion, the perfection of its tremendous networks and the magic of its ceaseless service, thrill and inspire us. But to the man on the street it is not nearly as wonderful and astonishing as radio or the motor car. To electrical men the present refinement of electric service, reaching well nigh every hamlet throughout this broad land and making available so many new contributions for labor saving, convenience and economy, is a dominating thought in life. But other men and women are far more consciously affected by the moving picture and by modern plumbing. This fact, I think, the power industry has failed to appreciate and analyze and to reckon with.

It is precisely to this point that I desire to direct your attention—to the point that it is a new kind of a market that we are facing today in the power industry. It is a highly competitive market and a market competitive not so much between manufacturers as between appeals. Success in such a market is very dependent upon three simple elemental factors: First, the quality of the product offered; second, its presentation and, third, both in place and importance, I think, its price. I would like to comment upon the position of electricity in the new marketplace from these three aspects.

As to quality, our case is clear and strong. There is no acceptable substitute for electric service in most of its common applications. Humanity admits its marvelous power and admires even when it does not adopt. The dependability and perfection of the physical service provided by the modern central station is completely satisfying. Quality, then, we may say, is unquestioned.

In the presentation of its product, however, I think that the electrical industry stands at a disadvantage today. And I have not forgotten that the power com-

*Address before the N.E.L.A. convention, Atlantic City, June 4-8, 1928.

panies spent $10,000,000 for advertising in 1926, according to the last available report of your committee on advertising. But let us examine into this expenditure.

That year the power industry enjoyed a total revenue of $1,652,000,000. It therefore appropriated about six-tenths of 1 per cent of its gross income for the purpose of telling its story to the public. However, $3,700,000 of that expenditure was for good-will advertising, $1,000,000 was for supporting the sale of securities, $4,300,000 went to advertise appliances and the remaining $1,000,000 was devoted to promoting electric service of all kinds. Does it occur to you that only the last two items are of any particular influence in the marketplace?

What you say to the public about appliances and about lighting or power or some other form of service applies directly to the industry's sales problem and registers in the new competition. But the advertising of securities, while entirely constructive and desirable, is a matter of financing and a matter of general good-will. It does not directly sell either service or equipment. And good-will advertising, while desirable in reasonable proportion, does not close sales, although it creates favorable sentiment. Therefore, 47 per cent of the power industry's advertising was directed to general purposes and only 53 per cent of the advertising expenditure was directly contributed to increasing the public interest in the actual things we have to sell and are urging them to buy. Our advertising appropriation to support our salesmen in the marketplace, therefore, figured about three-tenths of 1 per cent.

What Others Spend

But other industries that sell the popular market have learned that an adequate presentation costs more than this. Three cigarette manufacturers, for example, together spent $54,000,000 in advertising last year. And to compare percentages, one leading manufacturer of motor cars spent 3 per cent, a leading soap firm 2 per cent, a large paint manufacturer 3½ per cent. And so it goes. The contrast is striking.

Of course, the popular advertising of electrical manufacturers is a further contribution to the telling of the story of electricity, but this does not bulk large enough to upset the argument. A glance at the comparatively small weight of popular advertising that is advocating anything electrical amidst the pressure of promotion devoted to other appeals gives impressive proof that we are not making our voice heard in the marketplace. Moreover, the power industry cannot and should not depend on the manufacturer to popularize electric service. His first responsibility is to sell equipment. The central station must do its share of the market building and that share should be a generous one.

I would say, then, that the power industry is spending entirely too little money for advertising to make a strong presentation of its product. Instead of the $5,000,000 or so which your committee says was spent in the newspapers for this purpose last year, I believe the appropriation should be not less than 1 per cent of the industry's gross income. If it were 2 or 3 per cent for the whole industry, it would still be less than the three cigarette manufacturers spent last year.

I would say also that the power industry is spending entirely too large a proportion of its advertising appropriation for indirect appeal. I believe that in the past the executives of the electric power companies have made the very common error of inclining toward the kind of advertising that interests them and their friends instead of the kind that concerns the general public. Utility good-will advertising appeals to the electrical man. It can be made extremely valuable in interpreting the policies of the company and its service to the community. But by and large, the average citizen is far more interested in an advertisement that tells him about something that he wants or could use.

As a general rule advertising that increases a man's interest and confidence in the use of electricity will build more good-will than an advertisement designed to increase his interest and confidence in the utility company. He buys light or power or industrial heat. His wife can use a clothes washer or a refrigerator. They do not contemplate buying a power company. And they naturally assume and expect that electric service will be good and that the company will grow and deal fairly with the public. The very large proportion of good-will advertising—for much of the security advertising has a good-will purpose—I believe, is a direct reflection of the fact that the power industry has permitted itself to get into a defensive attitude in the relationship which it sustains with the public.

We forget sometimes that the strength of the automobile industry lies in the popularity of the motor car, not in the virtuous reputation of the automobile manufacturers. Automobile advertising talks not about companies but about cars. Electrical advertising, in my opinion, has its greatest sales and good-will value when it talks specifically about electric service in terms of definite uses and not about the central station. If you like your car you have no complaint against its manufacturer. If electric service has become a matter of your daily life and tied up with the habits of your home and the practice of your store or factory, you are well sold on the value of the power company to you.

The Right to Sell

There is a case in point, I believe, in the current criticism of the public utility associations for their expenditures in the presentation of their arguments against the proposed entry of the federal government into the power business, It lies not in the size of these appropriations. For in relation to the capital invested or the total revenues represented, they were not large. They seem small when we consider the menace of such political privateering upon the public service and the danger to the savings of the millions of investors involved, should such false economic doctrine prevail. But public attention is arrested by the fact that this money was spent for defense and the man in the street asks, Why?

Ten times that amount could have been spent in constructive advertising without comment. For America is accustomed to huge expenditures for market building. Men marvel at the amounts appropriated to advertise motor cars and talking machines, chewing gum and silk stockings. But they never question the business judgment of these manufacturers. The policy has proved itself sound before our eyes.

I believe that once this idea is made clear in this industry there will be no objection or opposition on the part of the regulatory commissions to large, properly balanced advertising expenditures by public utilities. I suggest that it would be well to analyze the comparative expenditures of this and other industries for market development, and to establish with the utility commissions the economic soundness of spending money courageously to increase the volume of sales per customer in order to make reduced rates possible. No one questions the right of a Wrigley or a Ford to advertise to this purpose. Why is it less sensible to promote aggressively this other merchandise? Every business has an inherent right to sell.

Again in the matter of the price of electricity, I have the feeling that as an industry we lack confidence and courage in our own values. Power companies have too often adopted a defensive policy on rates. But there is nothing wrong with the cost of electricity. The price is not too high. It stands alone in its record decline

among all the costs of living. Electric service is worth more than it costs today, reckoned against comparable services or commodities. And I believe that the present tendency among the power companies is to reduce rates too rapidly, forgetting that the whole psychology of America today inclines toward luxuries and is indifferent to the economy appeal.

I wonder if we are not making a mistake in talking too much to the public about the utility of electric service. As a matter of salesmanship, is not its luxury its most attractive feature to the rich and to the humble home alike? Review the outstanding examples of spectacular success in the popular market and it is striking that most of these products that have become the vogue in America and established themselves in modern life lie in the luxury class. Automobiles, travel, moving pictures, phonographs, radio, cameras, tiled baths, silk stockings, perfumes, cosmetics, safety razors, candy and cigarettes have all come into universal popularity through the luxury appeal. This experience cannot be ignored by electrical men. "Give us the luxuries of life and we will dispense with the necessaries," said a humorous philosopher, with a keen insight into human nature.

Price Courage

It is the practice in the American marketplace to advertise in order to increase sales and effect a larger production that will reduce the cost and make possible a lower price, which in turn will stimulate more sales. The power industry, in my opinion, has pursued a policy of reducing rates without sufficient provision for the development of the market. A rate reduction may save a million dollars in a year to the people of a city, but after the announcement is forgotten the small decrease in the monthly bill goes practically unnoticed. If that million dollars were to be expended in that single year in local newspaper display advertising, supported by such direct-mail, billboard and other attention-compelling methods of display as might be effective, can any one possibly doubt that electric service would win far more popularity and probably enough additional load to provide for the same decrease in rates without reducing revenues?

After all, rates are not such an intricate scientific affair. We need not fear them. The rate is just the price of a commodity that must be sold in competition in the marketplace. It must cover production cost and overhead and yet facilitate the selling. For this reason the so-called inducement or promotional type of rate gains steadily in acceptance in the industry. It encourages larger sales to the individual customer. And that has been a profitable feature in prices always. For the price of a piece of merchandise cannot be fashioned for the convenience and gratification of the seller alone. The prime requisite is that it should encourage the customer to buy.

The industry needs rates that will help extend the more complete use of electric service by every consumer, but the power company must have price courage and not give away in premature rate reductions the millions that should be spent in the development of the market. For it is more in the public interest that the comforts and economies of electricity be brought into universal use and made less expensive by the consequent increased production than that it be cheapened by price cutting before adequate money has been spent to build the market. So it is with us.

It is into this kind of an arena of large-scale merchandising that the power industry in now entering. And given the quality and given the presentation and given the price, there is one other essential without which success cannot be expected. And that is manpower. Fortunately the power industry is already well supplied in sales personnel. It has in recent years recruited an able staff of commercial-minded men who are eager to go forward. When the executive interest and backing and the financial appropriations needed for the larger operations are provided there need be no question of the capacity of the industry to play its part in the marketplace.

For the development of the popular market, the selling of a complete use of electric service in the homes of all the people, one other resource is vital. There is need for the upbuilding of a strong and prosperous independent retail trade in every community. The power industry cannot sell merchandise in adequate volume unaided. It needs a broad skirmish line of active dealers at every neighborhood center of household supply, each contributing his share to the growing load. It needs an army of contractors at work installing adequate wiring that the use of everything electrical may be made natural and easy. The encouragement and guidance of this independent trade to a progressive co-ordination will need leadership, sound policies and unselfish patience. And this will be forthcoming.

I have an abiding confidence and an increasing enthusiasm for the power industry. It has grown great in a service that has won the plaudits of the world. It has triumphed in invention, in engineering, in finance and in administration. It brings to the new problems of this oncoming commercial era resources that will carry over all obstructions. It will not fail to win new honors in the marketplace.

Text of Northwest Prize-Winning Speech Is Presented

FIRST place in the two-minute speaking contest for district managers held at the Northwest Electric Light and Power Association's convention at Portland recently was won by P. H. Craven of the Utah Power & Light Company who delivered the following address on "The Public Utility's Place in the Community":

With its property firmly established and constituting one of the foremost resources in the area served, the utility is, indeed, a physical part of the community—a permanent, fixed, tangible asset.

By attracting outside capital and affording, in customer-ownership, an opportunity for the investment of local funds, the utility constantly adds to the community's wealth. Through the local expenditure of the greater portion of its earnings in the conduct of its business, the utility contributes liberally to the prosperity of its territory.

In its function of relieving human drudgery, of improving industrial conditions, of furnishing a service indispensable to the public welfare, the utility becomes an essential factor in the social and commercial life of the community.

Power is a vital part of the community organism. The character of service and the company's tendencies have a stimulating or retarding effect with respect to industrial expansion. The community's destiny, which the utility helps to mold, is truly a part of the responsibilities to which it falls heir—something it cannot evade. Dedicated to the service of, and dependent upon the public for its existence, the utility is endowed with an obligation which prompts it to devote its every resource to the best interests of the social structure. This obligation of duty characterizes the utility as a community builder. As such, it has a conscientious concern in public affairs, but no business in politics.

Cognizant of the fact that to break faith with the public means disaster for the utility, it strives for good-will by honest effort and fair dealing.

Having its all at stake, with its hopes and ambitions invested in the locality where its property interests lie, with a knowledge that prosperity springs only from community well-being, the utility falls in line with every progressive movement by acting in concert with the community life as a whole. The utility and community are closely allied, their interests are mutual; neither can prosper without the other; they grow or stagnate together.

As its service gives vigor and life to the community, so should the utility, as an organization, be the pulsating heart in community life; the motive force behind community betterment; the backbone of community growth.

In the performance of its full duty as a public servant the first obligation of the utility is the betterment of electrical service. Primarily, its place in the community is to still further the use of labor-saving devices in the home and factory, to lighten human toil, to continue to raise the standards of living, and to bring more comfort and happiness to the human race.

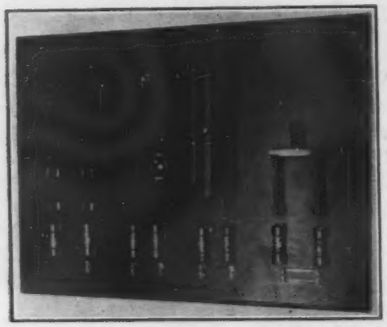
Engineering Practice

A Sensitive Ground Detector for D. C. Circuits

Inexpensive Combination of Lamps and Double-Coil Relay Gives Visual and Audible Alarm

By T. J. Lovell, Department of Engineering Design, Southern California Edison Company, Los Angeles.

NOT THE least of the troubles of the operator of a generating plant or substation is that of detecting, locating and repairing grounds on the d.c. control wiring. These grounds usually are progressive in their development and, if detected at once, can be repaired before they become of sufficient magnitude to constitute a hazard to operation.

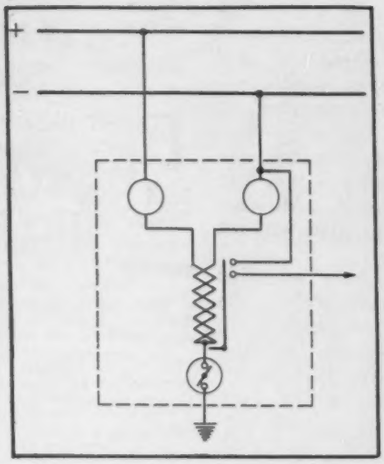


Typical panel layout for 32-volt d.c. ground detector. Panel usually is mounted immediately adjacent to the battery charging panel.

The well known method of connecting two lamps across the d.c. bus with the middle point connected to ground has several disadvantages. First: the ground must be of relatively low resistance before the difference in brilliancy of the two lamps becomes sufficiently definite. Second: the lamps themselves will not always maintain equal brilliancy under equal voltage conditions. Third: no audible alarm is provided, the indication being visual only. Fourth: the lamps will permit sufficient current to flow to operate certain types of auxiliary relays should their operating coils become grunded. This could easily cause disastrous results.

The Southern California Edison Company has been using for some time a d.c. ground detector which has successfully overcome all the disadvantages mentioned. This detector, which is shown in accompanying illustrations, has proved itself to be both reliable and extremely sensitive in its operation as well as reasonable in cost. It will indicate consistently grounds having as high as 2,500 ohms resistance and will not permit sufficient current to flow to operate even the most sensitive auxiliary relay used in circuit breaker control or in protection.

The principal of operation is very simple: a standard 15-watt switchboard lamp is connected to each bus and in series with one coil of a two-coil relay, the two coils of which are wound concentrically on the same core. The opposite ends of the two coils are tied together and connected through a snap switch to ground. The coils oppose each other normally and are of equal strength, but upon occurrence of a ground the coil on the grounded side



Connection diagram of d.c. ground detector showing 15-watt switchboard lamp in series with each of two differentially connected relay windings to ground. Operation of relay energizes bell or annunciator circuits.

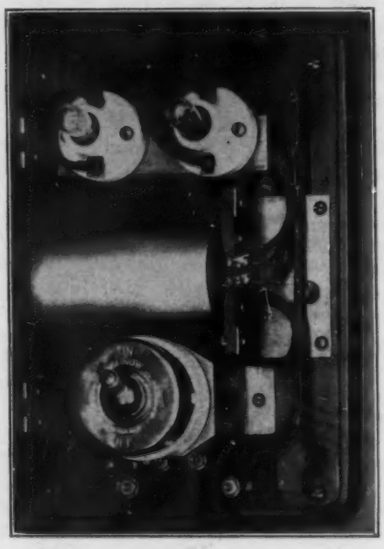
is partially shunted out and the differential in "pull" of the two coils closes the relay contact which in turn rings a bell or operates an annunciator. The alarm may be silenced either by opening the snap switch at the detector or by clearing at the annunciator. The lamps furnish a visual indication of the ground if it is of sufficient severity. However, the relay will close its contacts upon the occurrence of slight grounds which could not be detected on the lamps.

The Edison company follows the practice of sectionalizing the control and operating bus wiring, each section controlled through a knife switch at the d.c. panel. In addition, a knife switch is provided at each breaker mechanism which isolates the control wiring at the breaker from the d.c. supply. With the aid of a sensitive detector and the switches mentioned above, it is possible to locate and repair an incipient ground long before it has reached the condition of a hazard to operation.

It has been found that an initial adjustment of the relay contacts at the time of installation is all that is necessary. Routine tests are taken care of by momentarily grounding the d.c. wiring at various scattered points.

No trouble has been met with in the operation of the relay, but the presence of the lamps provides for a ground indication should the relay contacts stick or otherwise fail to function. If a relay is burned out or otherwise open circuited the lamps will be extinguished, calling attention to this condition. The snap switch is provided with "on" and "off" indication so that the operator may ascertain at a glance whether the detector is in service or not.

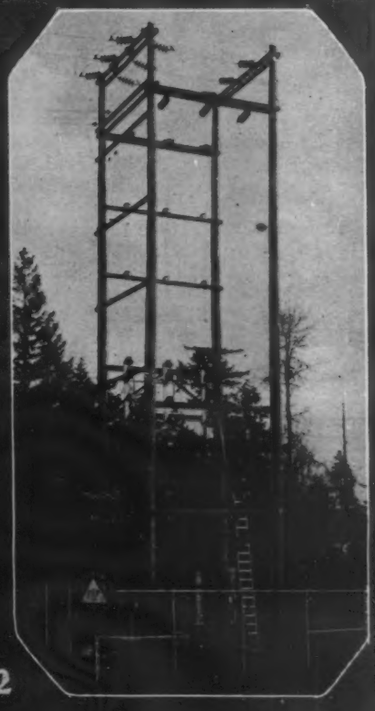
The accompanying wiring diagram indicates clearly the principle of operation. The other illustrations show the



Direct current ground detector complete and mounted inside of telephone bell box. Slots in cover provide ventilation, lamps show through circular openings in cover, and tumbler switch knob projects through cover.

32-volt detector with its panel assembly, which is usually mounted immediately adjacent to the battery charging panel.

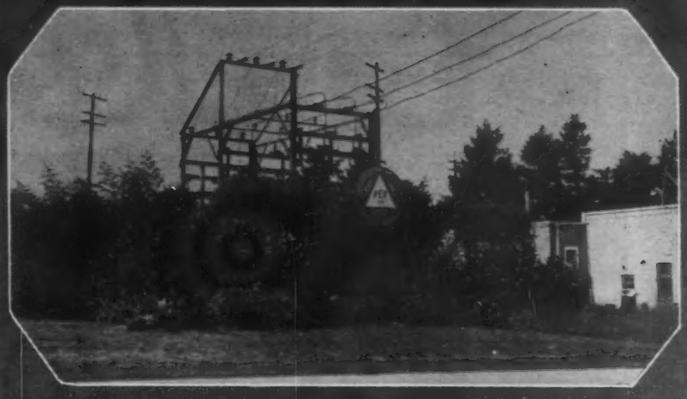
1



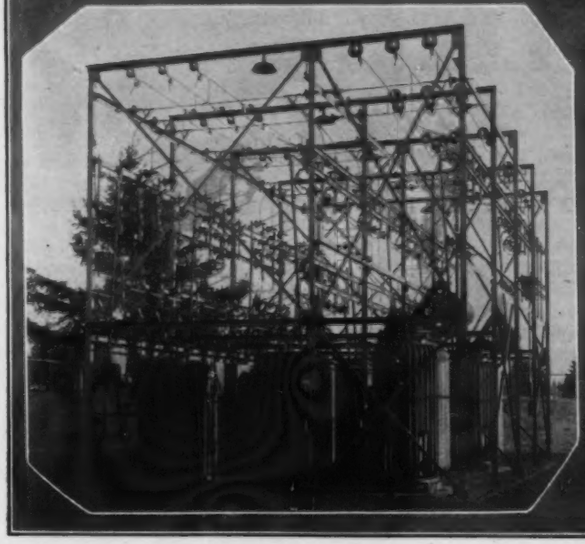
2

Some Typical Oregon Distribution Substations

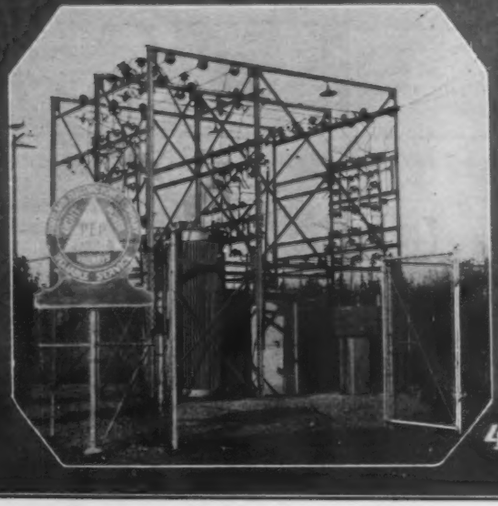
THESE views show several types of distribution substations that have been standardized by the Portland Electric Power Company. (1) A type used for 11/2-3-kv., 600-900-kva. residential service, one feeder, two single-phase regulators. (2) A rural job, 300-600 kva. capacity. (3) Type shown in (1) with shrubbery as used in more important residential areas. (4) The first step in a larger station, three feeders, reclosing equipment. (5) Another example of unit construction using all "outdoor" equipment.



3



5

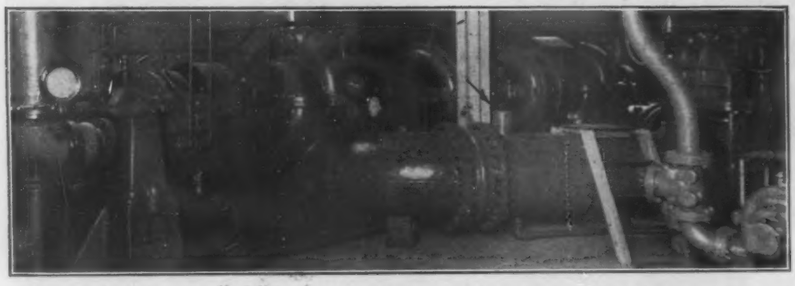


4

Control Mechanism in Circulating Line Prevents Back-Flow

By C. H. Hoper, Mechanical Engineering Department, Public Service Company of Colorado, Denver.

AN AUTOMATICALLY actuated pump control switch designed to operate upon the reversal of water flow in a condenser supply line is shown in the sketch below. This is a very simple device but with sufficient vane area its operation is absolutely positive and entirely satisfactory. The equipment has been in service for some time in the Valmont steam-electric plant of the Public Service Company of Colorado near Boulder, Colo.



Pump room of the Valmont steam-electric plant of the Public Service Company of Colorado. The "can" covering the contact element of the automatic control equipment may be seen on the circulating water pipe immediately at the right of the column in the center of the picture.

The particular portion of the plant equipment involved is a 30,000-sq.ft. condenser supplied by two rotary pumps each of a capacity of 25,000 g.p.m. One of these cooling water supply pumps is driven by motor only while the other pump is dually driven by a motor and a steam turbine. The power supply for these motors is from the plant three-phase auxiliary bus.

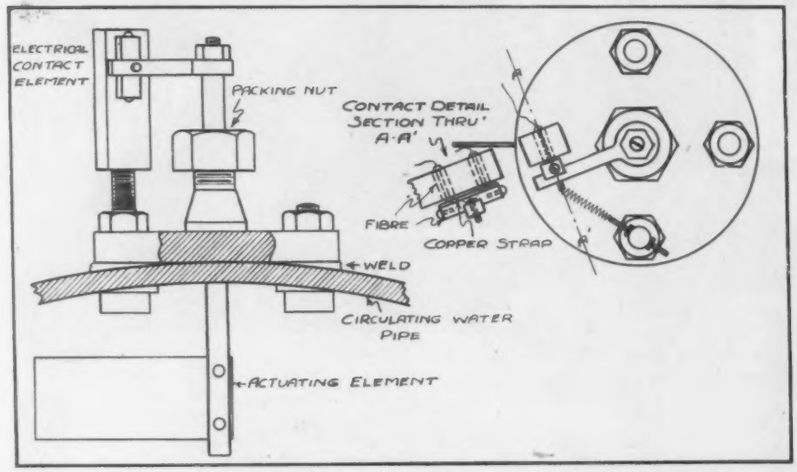
By way of further explanation there is a motor-operated gate valve installed at the inlet to each pump so that the flow may be regulated and back-flow prevented in the case of only one pump being operated. These gate valve motors are supplied with direct current from a motor generator set in parallel with a heavy station battery to insure an unfailing supply of energy for their operation.

Heavier loads and normal summer conditions require the operation of both of these condenser circulating pumps and thus any interruption to the three-phase house supply of course would "kill" the two motors resulting in one of the pumps shutting down completely and the other swinging its load from motor to steam turbine. With one pump operating and the other pump not operating, water from the operating pump would flow back through the "dead" pump instead of flowing through the condenser, thus causing loss of condenser vacuum and consequent turbine load loss.

To prevent such a reversal of water flow in the condenser supply line the automatically actuated control switch was designed and inserted in the pump line between the discharge of the motor-operated pump and the Y connecting with the other pump and with the condenser. This automatic switch controls the d.c. motor on the corresponding gate valve and the whole equipment is sufficiently sensitive and sufficiently rapid in operation to close the gate valve before the water velocity through the "dead" pump can reach an undesired degree.

The question naturally arises as to why check valves were not installed. Check valves were installed initially but their operation left much to be desired. Large dash-pots were installed with them to cushion the closing action, but even with these devices the resulting water hammer was so severe that the pipe line was endangered. The closing action of the motor-operated gate valve is such that water hammer cannot occur.

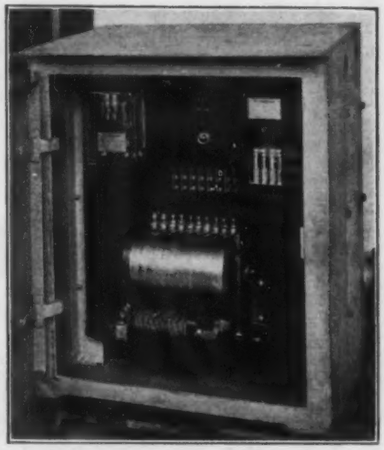
Service tests of the equipment described have given entirely satisfactory results.



Schematic diagram of details of vane control to prevent back-flow in condenser supply line.

New Model, Signal Originator for Automatic Substations

A shop-made device, developed by the Northwestern Electric Company of Portland, Ore., for use in sending alarm and other designatory signals from automatic unattended substations over an ordinary telephone line to the operator at the head office, was described on pages 146 and 147 of the March issue of Electrical West. The accompanying illustration shows the final development of the weatherproof and foolproof steel cabinet that has been built up to house the signal originating apparatus which is shown on page 146 of the March issue. This cabinet is simple in design, as may be seen, comprising only sheet steel and small angle members and making liberal use of welding. A tumbler-type "night latch" protects against unauthorized entry into the cabinet.



Signal originator for automatic substations.

Slight rearrangement and simplification in the panel itself may be noted as well as the fact that the driving motor and impulse control drum also are mounted directly on the main panel. The driving motor is an ordinary automobile type starting motor which is coupled to the control drum through a double worm gear for speed reduction. The whole unit is neat, compact, simple, useful and comparatively inexpensive.

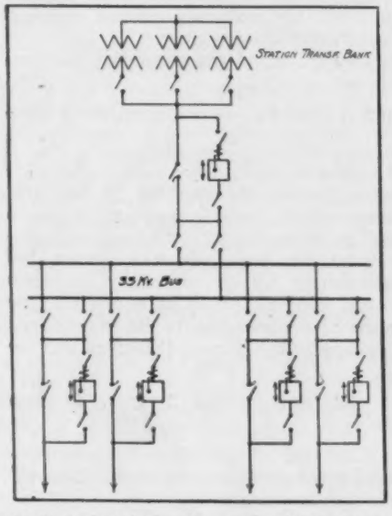
Unit-Type 33-kv. Rural Switching Center Gives Flexibility With Rigid Economy

By Francis Curtis, Engineering Department, The Southern Sierras Power Company, Riverside, California.

ECONOMY of installation and flexibility in operation are two important features that have been accomplished in the unit-type substation structure recently completed by The Southern Sierras Power Company at Perris, Calif. This particular substation is the switching center of a small 33-kv. network which serves lighting, industrial and heavy pumping loads in several communities. To provide for satisfactory operation it was necessary to have a flexible switching arrangement together with the necessary protective equipment and other incidentals, and to do this within the limits of an expenditure warranted by load conditions. Cost records on this station show a unit cost of about $5,000 per line, including everything chargeable to the job.

As shown in the accompanying typical wiring diagram the switching arrangement adopted utilizes a double 33-kv. bus together with one oil circuit breaker for each of the 33-kv. lines and one for the 33-kv. supply to the station transformer bank. At present the 900-kva. main bank at Perris is protected only by tetrachloride fuses. Through the arrangement of disconnecting and bypass switches shown, it is possible to provide for the necessary switching control of the various lines and to provide for the necessary inspection and possible repair of the oil circuit breakers all without any interruption to service. Gang-operated, air-break bus selector switches and bypass switches are utilized to simplify and expedite operation. Individual stick-operated disconnecting switches are used on the oil circuit breaker positions. Due to the fact that two of the lines are supply lines, it was considered unnecessary to install oil circuit breakers to complete a full normal double bus layout. The bypass switches are of such character and so placed that they may be used safely to interrupt the load over any of the four lines in the event that this must be done under conditions which make impossible the use of the oil circuit breaker for this interrupting service.

Three-bay 33-kv. structure at Perris, Calif., substation, The Southern Sierras Power Company.



Typical electrical scheme of unit-type substation for outlying switching points on 33-kv. network.

Induction relays are used for the protection of the lines and function to operate the necessary oil circuit breakers. These relays are supplied by bushing type current transformers and together with the necessary test links the relays are mounted in the switch rack inside a weatherproof galvanized sheet metal housing. Each breaker has such a relay box mounted at one end of the breaker frame; thus the units are complete. In addition to the breaker operation by relays there is arranged an alarm system together with an indicator system which shows the operator just which circuit breaker has been tripped.

At present three of the contemplated eight unit bays are completed. The structure is made up of fabricated galvanized angle iron. Lines are dead-ended on beams supported by square lattice columns while the columns for the support of the remainder of the structure are 3½ x 3½ x 5/16-in. angle iron. Each bay is 12 x 31 ft. and 25 ft. high. The structure is encircled by a ground bus which is tied in solidly to the steel work at numerous points and also is tied solidly to each of the oil circuit breaker frames.

Electrical Instrument Aids in Teaching Deaf to Speak

A new method of teaching the deaf to speak which promises to simplify that extremely difficult task is being put to a practical test in a series of experiments now being conducted at the Western Pennsylvania School for the Deaf, near Pittsburgh.

The new method, known as "voice vision," utilizes the Osiso, which presents the voice in visible form by transforming sound waves into light waves. By means of this device the teachers expect to aid the 300 deaf children in the school to gain greater control of their vocal organs and eventually to achieve better and more pleasing voices.

In the "voice-vision" classes the teacher speaks a sustained note, such as "ah" or "oh," into a telephone receiver attached to the Osiso, and has the child watch the path of light waves which follow on the screen. Then the child is bidden to make the same sound. By experimenting with his voice the child soon reproduces approximately the same picture as the teacher, which means approximately the same sound.

Analysis of Current Transformer Tests—XIV

Outline of Autotransformer and Current Transformer Combinations

By E. C. Goodale, Tacoma, Washington

IN PART XI were discussed certain basic principles underlying transformer action. The same fundamental laws hold for current transformers and autotransformers as for the voltage type; the action, however, is reversed.

The current in a current transformer secondary or tap lead depends upon the current in the primary and upon the ratio of turns. As before, the total primary ampere-turns must equal the secondary ampere-turns plus the exciting ampere-turns. If the secondary leads are short-circuited through very low impedances (such as ammeters, relays or the primary of some succeeding current transformer whose secondary is short-circuited through a low impedance) the exciting ampere-turns at full load will be very small. Hence it may be assumed with little error that the secondary ampere-turns are equal and opposite to the primary.

A very common exception to this rule occurs in the case of low-ratio bushing-type current transformers, which naturally have but few secondary turns. In these bushing current transformers the leakage of flux is so great that the exciting current is relatively very large, and hence the secondary current relatively very low. The following discussion therefore applies to the wound-primary type only.

For example, in Fig. 38(A) there are $10 \times 10 = 100$ primary ampere-turns in the current transformer at the left tending to force a flux clockwise around the core. Therefore there will be 100 ampere-turns in the secondary tending to force it counter-clockwise. The only resultant flux which will flow will be that due to the very small exciting current. This small amount of exciting current will force just enough flux around the core to induce just sufficient secondary voltage to force the normal secondary current through the impedance of the secondary load. The impedance normally is very low in order to keep this secondary voltage low and hence the flux low and the exciting current small so that the secondary ampere-turns may be more nearly exactly equal and opposite to the primary. For, the more nearly they are equal the more perfect the transformation. Inserting high impedance in the secondary of a current transformer cuts down the secondary current by the amount of extra exciting current that is needed to produce a secondary voltage large enough to send this secondary current through the increased impedance.

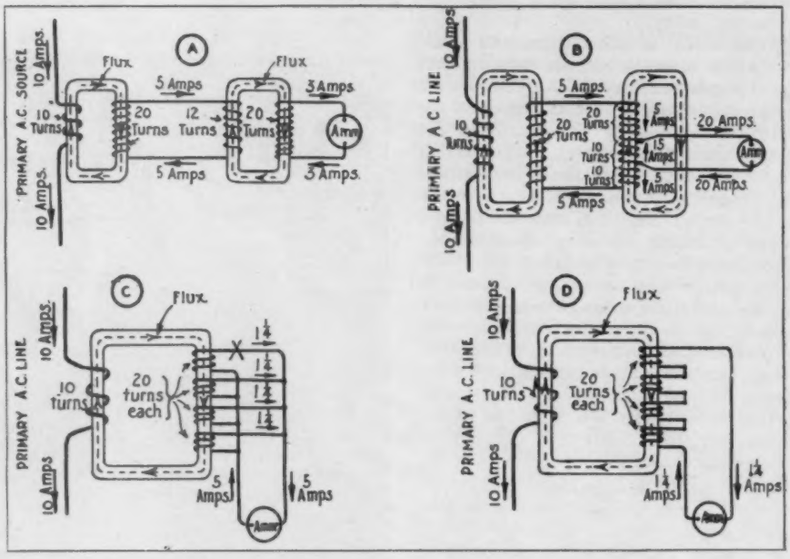
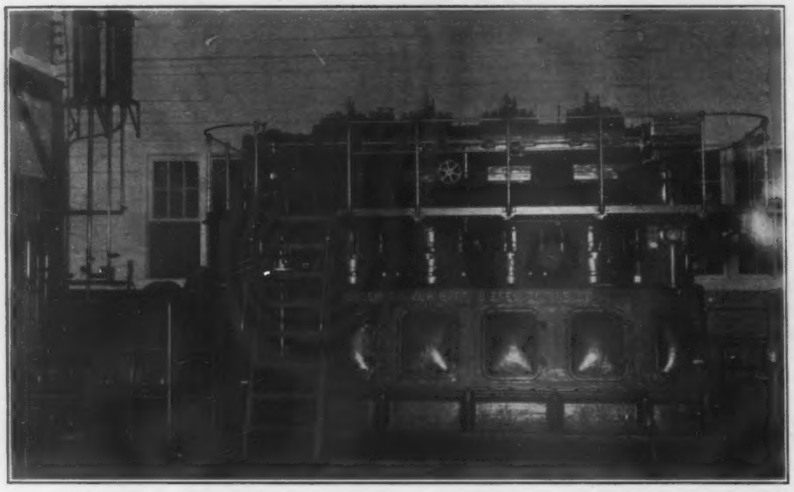


Fig. 38. Current transformer with multiple secondaries.

In Fig. 38(A) the secondary current must, then, be $\frac{100}{20} = 5$ amp. for a low-impedance secondary load. These 5 amp. flowing through the 12 primary turns of the transformer at the right will produce $5 \times 12 = 60$ ampere-turns around its core and they must be neutralized by 60 secondary ampere-turns, provided there is a low impedance also connected to its secondary. The secondary current therefore will be $\frac{60}{20} = 3$ amp., these 3 amp. flowing through the 20 secondary turns to produce 60 ampere-turns opposing those of the primary.

Current autotransformers can be used in place of current transformers in places where isolation of the secondary from primary voltage is not an important consideration. Fig. 38(B) illustrates the use of a current transformer feeding a current autotransformer, the former for insulating purposes and the latter for adjusting the value of secondary current. Of course they could both be replaced by a current transformer of different ratio that would

A Nevada Central Station Diesel-Electric Plant



A 365-hp., four-cycle, direct-connected Diesel-electric unit in the Elko, Nev., plant of the Elko-Lamoille Power Company. This plant is used to supplement the output of the company's hydro-electric plant at Lamoille. The unit was installed in 1922 and has made continuous runs of as long as 142 days; during one eight-month period the unit was shut down a total of only 32 hours. It is claimed that the lubricating oil consumption has amounted to 0.042 gal. per rated hp.-hr., and that the fuel oil has averaged 0.0952 gal. per kw.-hr.

produce the same ultimate secondary current. However, commonly in relay applications and sometimes elsewhere it is necessary to have a certain ratio of primary-to-secondary current that a current transformer of standard ratio will not produce. Then it is more economical and more flexible to use a standard current transformer plus an adjustable-ratio autotransformer.

When there are a number of secondary windings the currents taken by each, when they are paralleled, will be inversely proportional to the impedances of the windings and conductors to the points of parallel connection. This assumes that they have equal numbers of turns, as they must have in order to avoid the localized flow of currents circulating between the windings and not appearing in the external circuit.

Ordinarily, then, the impedances of the windings will be approximately equal. The impedances of the conductors to the points of parallel connection, however, may not be equal. Another quite common factor entering in is the impedance of terminal connections. These may not be numerically high, yet in comparison to the very low impedance of the rest of the circuit and of other terminal connections they may be relatively very high and may unbalance the currents in the parallel branches.

Fig. 38(C) shows a current transformer with four equal parallel secondaries. The primary has 10 turns and each secondary 20 turns. Resulting current in this case is 5 amp. total, each carrying 1¼ amp. Fig. 38(D) shows the same primary with these four secondaries in series and hence totaling 80 turns. It may be seen that here again the coil current is only 1¼ amp. There are, however, only 1¼ amp. through the ammeter in Fig. 38(D) whereas in Fig. 38(C) there are 5 amp. flowing through it. It is apparent, then, that whether in series or in parallel the secodaries each will carry current (amperes) equal to the primary ampere-turns divided by the total secondary turns, provided of course all secondary connections are good and tight and the secondary impedance is low. Had there been only one secondary winding of 20 turns its current would have been $\frac{100}{20}$ = 5 amp. as in Figs. 38(A) and (B) (at the left).

Suppose one of the secondary leads of Fig. 38(C) were to break as at X. The remaining three would have to carry the load, their currents each being equal to $\frac{100}{3 \times 20}$ = 1.66 amp., thus again totalizing up to give 5 amp. In this case there would be no dangerous rise in voltage across the opened secondary since the remaining windings neutralize the primary ampere-turns.

As was previously mentioned, it is not practicable to parallel windings of unequal numbers of turns since the same flux interlinks all and hence induces the same voltage per turn. Therefore those windings having the greater numbers of turns would have greater induced voltages, hence pumping localized short-circuit currents through the windings which had the fewer turns. These currents would not appear in the external instrument circuits and would heat the transformer unnecessarily.

If feeding independent instruments or loads, more than one secondary winding could be used, each having either the same or different numbers of turns. Currents appearing in their circuits would be in direct proportion to their turns but in inverse proportion to their impedances. If the impedances were known, the currents could be found in the same manner and with the same equations that were used in determining the primary source currents in voltage transformers of more than one primary winding. (See Part XI, Electrical West, April 1, 1928.)

However, since the secondary circuits of current transformers almost always are relatively very low, the contact resistances of the terminal connections would be relatively high and not always the same, even varying with the surrounding air temperature. Hence the true impedances of the secondary circuits would not be known well enough to allow the actual currents flowing in these secondaries to be determined accurately.

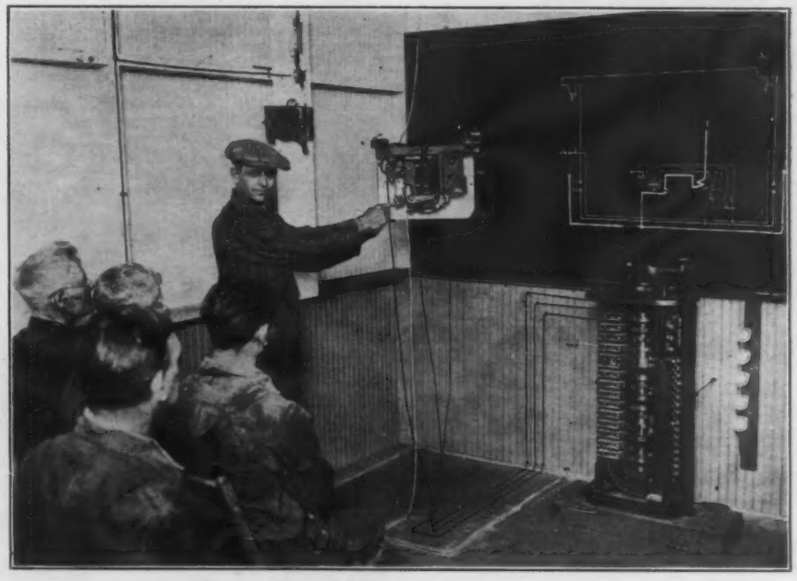
Therefore it is impracticable to have more than one secondary winding unless they are put in parallel or series. If in parallel, they should each have the same number of turns.

This and the preceding discussions have applied to single-phase transformers and autotransformers. The load currents in all cases have been assumed in phase in order to make unnecessary the use of vectors. In the actual case they may not all be in phase, hence for an exact solution the addition of ampere-turns and current values would have to be vectorial. As long as the currents are approximately in phase, however, the results will be very nearly the same by using the numerical instead of the vectorial solution.

In polyphase transformers and autotransformers the same fundamental laws hold as for the single phase. However, in the 3-phase transformers, for example, inasmuch as the flux due to the primary of one phase has multiple paths through the windings of the other two phases, and vice versa, it induces voltages in them and they in it which also must be taken into account in all computations. The resulting action depends upon whether they be "core" type or "shell" type transformers as well as on how they are connected. Hence they require special study in themselves and will not be included here.

EDITOR'S NOTE: This is the fourteenth of a series of articles by Mr. Goodale. The next article will summarize the entire series, bringing out the more important points and will include an index of the series.

A Practical Demonstration of Equipment Operation



Here is an idea that the Los Angeles Railway Company has found to be of great service in instructing new men in the theory and operation of street car control equipment. This same idea could be carried out to advantage by electric service companies in training employees in the operation of electric meters, relays, control apparatus and even larger machinery.

The scheme is shown quite plainly in the illustration and consists of a standard drum-type controller, contactor, the necessary wiring, and a bank of lamps acting in this case as the load or street car motor.

Voltage Complaints—Causes and Remedies

A Few Homely Items of Importance in Building Good Will

By Maurice D. Smith

THE subject of voltage complaints is one in which all electric light and power companies are interested. The aim is to maintain a high quality of electric service that will insure customers' good will and to build a service policy that will make a friend of the consumer. To promote such a feeling a voltage complaint department should be maintained by the company to give the utmost co-operation to customers in analyzing and rectifying any unsatisfactory service condition which may be bothering the customer.

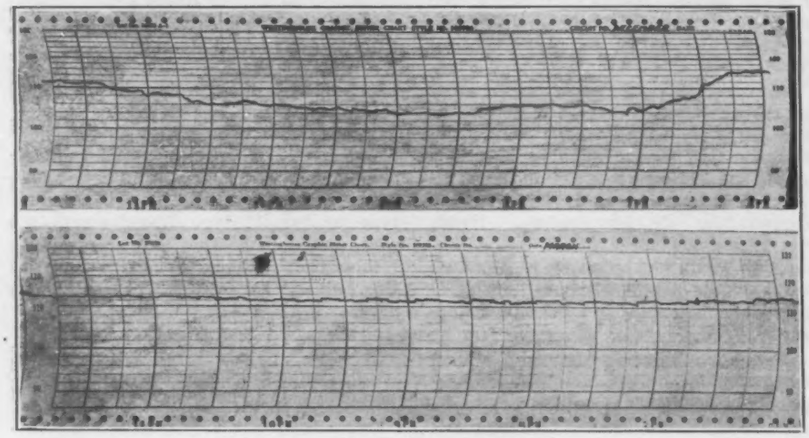


Fig. 1. Low voltage due to drop in a long secondary (above), and the same line with the same load after replacing No. 6 wire with No. 2/0.

As a rule this service can be handled effectively by a "complaint engineer" with field testers for setting graphic meters and taking readings on poles, etc., and the proper co-operation from construction departments.

Few companies are without complaints, some unfounded and many due to the customer's unfamiliarity with the company's policy and business, which to the customer seem mystifying. It is, therefore, a worthwhile job to explain the company's policy to such customer. Courteous attention and prompt action will turn an angry complainer into a friendly booster.

It is the object of this article to pass along information based upon an Eastern company's experiences with some of the causes of voltage complaints and with methods adopted to overcome the troubles and prevent recurrence.

Complaints may be divided into two major divisions, high-bill complaints and voltage complaints. The former is purely a commercial problem and is handled entirely by the commercial department. Voltage complaints may be subdivided into three classes, low voltage, high voltage and fluctuating voltage.

Low Voltage Complaints

1. Most low-voltage complaints result from a customer using lamps of a higher voltage rating than the voltage supplied by the electric company. This generally is due to the customer purchasing a cheap "bootleg" grade of lamp as "economy."

A 120-volt lamp used on 115-volt service gives only 85 per cent of its rated lumens and this drop in illumination is very noticeable. If this condition is explained to the customer the complaint is not likely to recur.

2. Occasionally low voltage results when the customer is located at the end of a long secondary, a condition caused by too small wire which results in an excessive secondary drop. To actually prove this and determine just what the voltage drop is, graphic voltmeters are installed for a 2-day period at the complainant's premises and at the home of the first consumer adjacent to the transformer serving that particular feeder. The chart located at the complainant's will be similar to that shown in Fig. 1, while the chart placed with the first consumer would show a line nearly straight. The condition is corrected either by an additional transformer near the complainant, or by replacing the secondary conductor with larger wire, depending upon the relative cost and the effectiveness of correction.

Upon completion of whatever changes are made, it is well again to install graphic voltmeters at the complainant's as a retest, in order that a complete record may be available and to show the actual results of the changes. It is advisable to follow the completion of the alterations made with a graphic test in each of the following cases of low voltage and flickering light complaints so as to have a chart to show the customer. Charts shown in Fig. 1 indicate the result of replacing No. 6 secondary wire with No. 2/0 wire.

3. Sometimes low voltage may result from an overloaded transformer, in which case it is necessary to make a load test on the transformer providing no transformer loading records are available. The correction, of course, is to replace the transformer with a larger one, or to hang another one and cut part of the load over to it.

4. The feeder voltage regulator and auxiliaries may have lost their adjustment and be sending out a lower voltage than originally set for. This is determined by checking the station voltage at a light load period. In case the station voltage is low, the contact-making voltmeter is reset for its proper base value and graphic voltmeters are set at the load centers to ascertain whether the compensator settings are still correct. A subsequent retest at the complainant's may show that this regulator change has corected the condition complained of.

5. Low-voltage complaints have been caused by a regulator motor fuse blowing during a light load period when the regulator was at zero boost or a partly buck position. Such regulators were installed in an automatic substation where personal attendance was infrequent and the condition often explained itself by complaints coming from various sections of the territory fed by the same feeder. Locating the transformers feeding each complainant on the feeder map, and noting the phase to which each transformer is connected will give an indication that the trouble exists on that phase. Another check may be made by taking indicating voltage readings at the premises of the various consumers who complained, and the voltage should be found to be approximately the same.

6. Where two or more transformers are banked through secondary switches it is possible that the primary fuse on one of the transformers might blow, thus throwing the load on the remaining transformer or transformers. This often results in overloading and causes low voltage at a point which formerly received good voltage from the transformer now dead. Fig. 2 shows a chart taken at a point near a transformer with a blown fuse, and is typical of this condition. Indicating voltage readings taken adjacent to the banked transformers, when there is some load on the secondary, will show a lower voltage at the transformer with the blown fuse, when it should be the same in each instance. Replacement of the blown fuse, of course, restores the voltage to normal.

7. A loose connection on a secondary neutral wire of a three-wire 115/230-volt secondary will cause low voltage on one side if the load is unbalanced. This condition is detected easily by installing two graphic voltmeters at the complainant's meter. As soon as load is applied on one side the voltage on that side will drop rapidly, while it will rise in proportion on the other. As the load is varied from side to side the voltage will vary in proportion to the load and will give an irregular curve with abrupt changes.

The fault may be located by applying

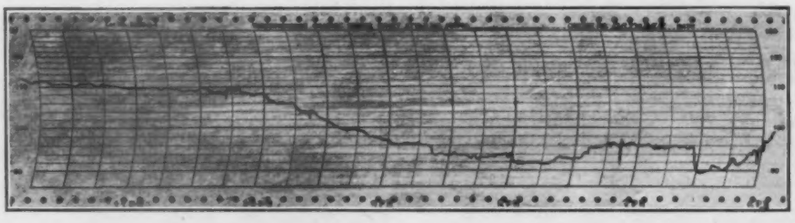


Fig. 2. Low voltage due to a blown primary fuse.

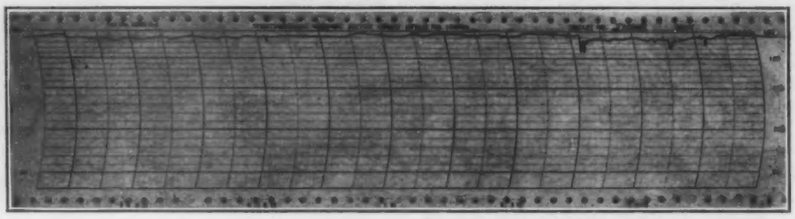


Fig. 3. High voltage due to the inadvertant use of a 9/1 transformer instead of a 10/1.

load to one side and then taking voltage readings between each live leg and neutral, on every pole, working from the complainant's toward the transformer. When a point is reached between the fault and transformer the voltage will become balanced.

This condition also frequently occurs in one type of kw.-hr. meter fuse cutout, that is, in the type where the neutral wire is fused and the fuse has blown. However, it is advisable to inspect the neutral fuse before looking for a secondary break. If there is a neutral fuse it is a good idea to fuse it solid in order to prevent the above condition.

8. Not all low voltage complaints are due to the electric company's lines and equipment. Often a customer complains to the company of low voltage at a certain point in his shop or plant which a test shows to be due generally to the circuit being overloaded or a long run of small wire from the meter to the machine. A voltage reading at the meter shows it to be satisfactory, but when taken at the machine it is found to be low. Advice to the customer regarding the necessary changes will be appreciated by him.

In determining the cause of a low voltage complaint it is not essential to investigate for each of the items mentioned. Instead, by asking the complainant a few simple questions based on each of the above items, and by analyzing the answers, the course of procedure can readily be decided upon. The same principle holds for what is to follow.

High Voltage Complaints

High voltage usually results in lamp burn-outs, and requires prompt attention because the customer objects strenuously to buying more lamps on account of the power company's poor service.

1. The most common cause of high voltage results from the feeder regulator equipment losing its adjustment. The station voltage can be checked as discussed in item 4 under Low Voltage Complaints, and if the base is found high during a light load period it should be adjusted to its proper value, the same procedure being followed.

2. Some companies use transformers having various ratios and sometimes a transformer having 10 :1 and 9 :1 taps has been used on its 9 :1 taps and then re-installed without changing taps where a 10 :1 transformer should have been installed. Fig. 3 shows a voltage chart illustrating the result. Instead of 115 volts on the secondary system it is 128, which when impressed upon a 115-volt lamp will reduce its effective life from 1,000 hours to only 260 hours. The lumen output will be increased 42 per cent, but the cost of renewals obviously will be excessive. This condition is determined by taking indicating voltage readings at the complainant's and then making a check at a consumer near a transformer connected to the same primary phase as the one in trouble, but served by another transformer. Reconnecting the transformer to its 10 :1 taps will rectify this problem.

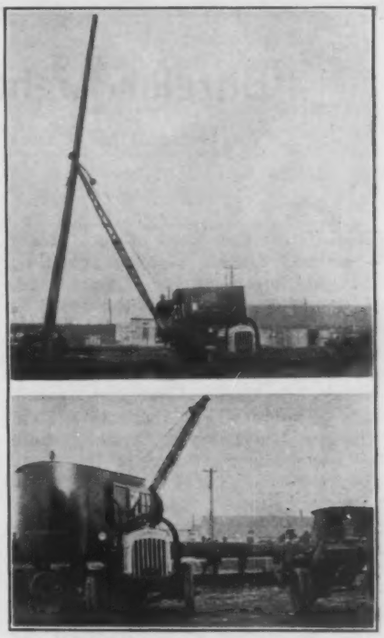
3. Due to an oversight a transformer may be tapped to an "express" feeder near the station. This feeder is compensated heavily for long-line drop and operates at a higher voltage. It will cause high voltage on the secondary of the transformer. Retapping the transformer to a local feeder will overcome this situation.

4. High voltage may result from a broken neutral or unbalanced secondary systems, the case being the reverse of the condition outlined in item 7 under Low Voltage Complaints. The same procedure is followed in locating the trouble as indicated in item 7.

Derrick Truck Facilitates Pole Handling and Setting

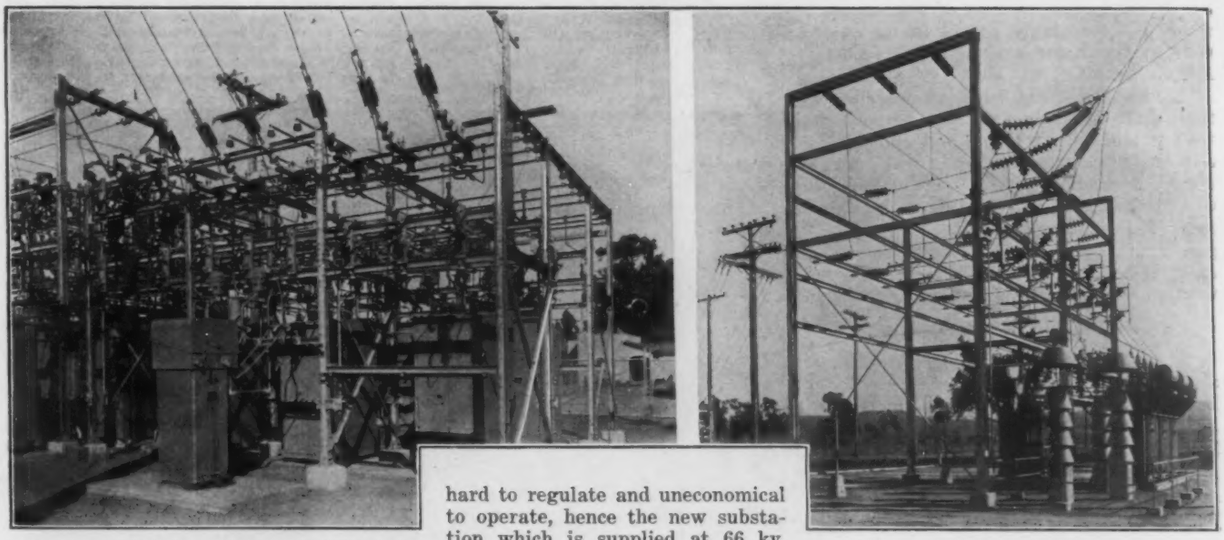
By A. VILSTRUP, British Columbia Electric Railway Company, Ltd., Vancouver, B. C.

For handling of materials in and around the storage yards as well as on construction work the truck-mounted derrick shown in the accompanying illustrations has proved itself a valuable piece of equipment. The derrick is powered by a separate gasoline engine and may be swung to any desired position with respect to the 7½-ton truck chassis. The boom is 23 ft. long and will handle a maximum load of 3½ tons. A load can be lifted at the rate of 60 ft. per min. on a single load line.



This derrick truck is used for handling poles and other equipment around the yards and for lifting and setting poles out on the road.

A Southern California Rural Substation



El Cajon substation of the San Diego Consolidated Gas & Electric Company, recently built to serve the growing electrical needs of the valley of that name about 20 miles east of San Diego. In El Cajon Valley the appreciable irrigation load formerly was served by means of rather long 11-kv. lines. These were hard to regulate and uneconomical to operate, hence the new substation which is supplied at 66 kv. (rack structure at right above). The 11-kv. structure accommodates four 12-kv. feeders with full switching, control, and regulating equipment and provides for four future feeders and is a second transformer bank. The 4-kv. section (left above) serves three feeders, station service and street lights, and provides for five future 4-kv. feeders and a future synchronous condenser. The 11-kv. and 4.-kv. oil circuit breakers together with their control and instrument equipment are mounted in individual steel cabinets. This is a new feature as far as this company is concerned.

Ideas for the Contractor

"Burglar Lights" as Profitable Contractor Business

Not Difficult to "Crack" Into Bigger Jobs for New Houses or Into Rewiring of Old With Appeal to Greater Security

UNLIGHTED, a house at night might as well have a sign on it telling burglars there is no one at home. This statement was made by the chief of police of Los Angeles at a luncheon club, as far back as 1921. Not long ago the superintendent of police of Chicago declared, "Burglars rarely enter a home where there is a light burning. Leaving your home in total darkness is an invitation to the sneak thief."

That burglars are afraid of light follows as a natural corollary the long known principle that well lighted streets are a deterrent to crime.

Harry Harper, manager Graybar Electric Company, Los Angeles, has made the subject of burglar lighting for the home a special hobby since he heard what the police chief of his city declared. He has followed the reasoning through to its possible consequences in increased market for the electrical industry. Burglar lighting systems, he declared at a recent Electragist convention, offer the progressive electrical contractor an opening for not only higher grade installations on new homes but an entree for rewiring of old homes which is exceedingly potent in its appeal to the homeowner. Mr. Harper said, in behalf of the idea:

"I have discussed such an installation with a number of my personal friends and as yet I have not come in contact with anyone who was not almost immediately sold on the idea. One of my friends, building a home, said, 'I don't care what it costs. I'm going to have it. Why, the sense of security which it would afford would be worth many times more than its cost.'

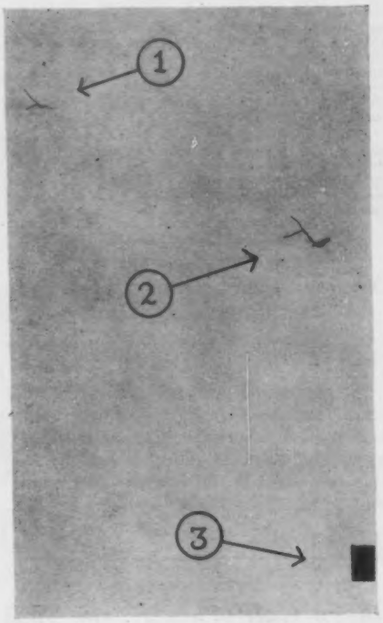
What Complete System Means

"If I were building a home today, in addition to wiring it in accordance with Red Seal specifications I would include a burglar light system wired as follows:

"I would locate a master switch in my bedroom so that if I heard an unusual noise in the house which aroused my suspicion I could, by operating it, light at least a minimum of one lamp in all the halls and rooms in the house other than the bedrooms, and would so wire it that the lights could only be turned off from this switch. I would wire the bedrooms separately on another master switch, the idea being that there might be times when I would not wish to disturb unnecessarily those who might be sleeping.

"In addition, I would locate lights around the outside of my house and garage, so that if I heard a suspicious noise on the outside I could throw a flood of light around my entire place by operating another similar switch. I would locate the master switches adjacent to the space provided for the bed, and if there were more than one such space I would locate switches accordingly, wiring them in multiple.

"Also, I would install my service leads underground, which would eliminate the possibility of their being cut by an intruder before entering my house and at the same time make a more desirable installation.



Location of outlets on wall of master bedroom. (1) The bridle wire outlet for the burglar light. (2) The switch for complete system will be placed here. (3) Convenience outlet near bed location for bed reading lamps.

"It is realized that the idea of such a plan of wiring is not new, there having been some such installations made, but suppose we take a look at the commercial possibilities and the self-interest and sales appeal involved.

"**To the Public**—A wiring installation which affords not only insurance against loss of property and protection to life, but in addition a sense of security which is almost invaluable; also less crime.

"**To the Power Company**—A larger load through the outside lights also being used for floodlighting. Public good-will.

"**To the Manufacturers and Jobbers**—Another step toward the complete electrification of the home and the sale of more materials.

"**To the Contractor-Dealer**—A practical sales plan around which it should be possible to sell a model wiring installation. The sale of a burglar light system in many instances would result in gaining the confidence of the customer and assist in selling a proper wiring job. Suppose we take a job on which there are four contractors soliciting the business; three of them say, 'I would like to figure your job.' The fourth contractor shows the customer how his wiring system can be improved by the installation of a burglar light system and then follows up with other constructive suggestions. Would he not be successful in many instances in gaining the confidence of the customer to the extent

A typical room. The wire protruding from the wall above the convenience outlet will be made to serve the burglar light, which is to have a bracket of its own in keeping with other room fixtures.

that he would be able to obtain a fair price for the job—remove the job, through service, out of the price class?

"Rewiring Present Wired Homes—The importance of rewiring the present 16,000,000 wired homes in the United States is conspicuously before the industry. Perhaps a part of this job could be tied around the burglar light system. It might be used as an entering wedge to secure the rewiring job. With its merchandising appeal perhaps in many instances the burglar light system could be sold first and then the remainder of the wiring necessary to make an up-to-date installation could be done at the same time. We need to bring all homes up-to-date so as to provide adequate wiring for the convenient use of things electrical.

"Enlisting the Support of Insurance Companies and Police—We might, as an industry, be successful in interesting the burglar insurance companies in such installations to the extent that they would make a lower rate for houses equipped with a burglar light system. Supposing every time an insurance company wrote a burglar insurance policy they inquired whether the home was equipped with a burglar light system, as they now inquire about a watch dog, on the same basis that the fire insurance companies today inquire whether the roof is shingle or tile. Don't you suppose the insurance companies making this inquiry help to sell tile roofing? Surely they do. If we could get the insurance companies to do this it would help a lot in putting over the job. We should also be successful in enlisting the support of the police. Police officials frequently talk before organizations and are in contact with those having experience with burglars. By acquainting them with such a system their mention of it, along with a short explanation, would help a lot to put over the job.

"So I present the idea of a burglar light system as one example of a commercial possibility around which, perhaps, we as an industry can rally and use as a basis to sell our service."

For the Moderate Priced Home

While Mr. Harper was reciting the details of the burglar light system there were present at the convention Tom and Al Woods, of the Shasta Electric Company, Redding Calif. (see Electrical West, July 1, 1928, p. 40), who, after the meeting, described a burglar light system which they had worked out and installed in a number of moderately priced homes where the expense of the full system described by Mr. Harper would not be possible.

The pictures on the facing page show something of the idea. Instead of wiring one lamp in each fixture in the burglar light system the Woods brothers wire an entire supplementary system in bell or bridle wire. The wiring terminates in small special fixtures to match other fixtures, but employing 6-volt automobile lamps. The system is served by a bell or other small transformer and not from the regular lighting circuit. A master switch in the master bedroom turns on these small but effective lamps in every room in the house. The advantage of this particular system is that it takes no more current than a bell system and hence can be run in quickly and economically at a total cost of from $10 to $15 for an average five-room bungalow, fixtures of course being extra. It makes an excellent selling point to accompany the Red Seal job, these enterprising contractors have found.

"Let Me Figure the Job"

I was walking with an electrical contractor and a man owning an industrial plant (says Harry Harper, manager, Graybar Electric Company, Los Angeles), and this conversation took place:

Plant manager: Sam, I'm going to have a good sized job one of these days. We're going to put up a new plant.

Contractor: Fine, let me know when you're ready—I'd like to figure your job.

When the plant manager had left us I asked the contractor:

"Just why did you tell Bill that if you were the low bidder on his electrical work you would like to have the job?"

"Why, what do you mean?" asked Sam. And I replied:

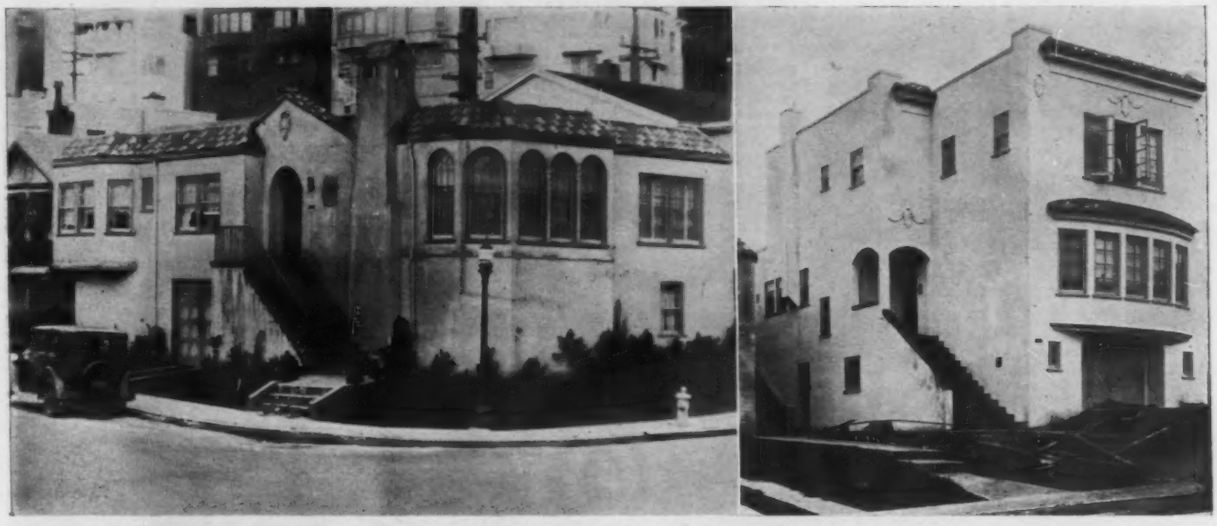
"When he told you that he was going to have a job before long the door was wide open for you to step in and do a selling job. But you told him you would be glad to *figure* it, which is the same as saying that all electrical work is alike and that if he got a bid from someone else cheaper than yours he would be justified in giving it to someone else. Why didn't you tell him to let you know when he was ready and you'd come down and lay out a first class electrical job, use only high class materials and put it in with the best mechanics and otherwise take advantage of the opportunity to raise the job out of the price class?"

My friend, who was a quality contractor, got the idea and said that he guessed it was a bad habit—that he had been overlooking a good bet.

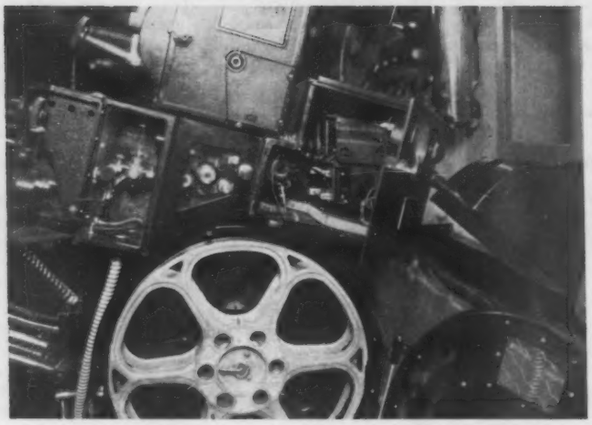
Second Copy of Safety Orders—A second copy of the State Safety Orders will be supplied to any contractor or inspector requesting it, without charge, according to announcement made by George Kimball, department of industrial relations, State of California. Formerly a charge of 50 cents was made for a second copy of the Safety Orders, but in order to enable contractors and inspectors to have the copy rather than try to do without, a second copy will now be furnished without charge upon request.

New Lighting Data Bulletins—"Lighting of Schools and Gymnasiums" and "Street Lighting with Mazda Lamps" are two new bulletins issued by the Edison Lamp Works. The former contains much working data such as school lighting codes, principles of school lighting and special lighting for classrooms, service rooms, corridors, shops, laboratories, etc. Gymnasiums, swimming pools and other applications are also treated.

San Francisco Contractors Have Taken Unto Themselves Red Seal



The number of electrical contractors who believe in the Red Seal plan enough to build homes embodying its standards—and, in fact, going them one better—is increasing every day. Walter Mohrdick, San Francisco electrical contractor, recently moved into his new Red Seal home (*left*) in the Ingleside district. Just over the slope Joe Unger finished up his new Red Seal home (*right*).



A close-up of the Movietone equipment on a projector head with lamp and photo-electric cell compartments open.

Talking Movies

Small Theater Can Have Big-Show

"TALKIES," as the talking moving pictures have been dubbed, are now very much in the public eye and ear. A number of the prominent theaters in all large cities are either equipped with the apparatus for these types of presentation or are making installations. The "fad" promises to be more or less permanent and a consideration of its most favorable applications holds forth possibilities for the electrical contractor of any sized city.

For the small theater in a rural community or a neighborhood playhouse in a large city, the equipment has features that are particularly valuable assets to the operation of the theater. In the large city theater its place is established for the premier showing of feature pictures with accompanying sound. Yet it is to the smaller theater and the remote one that its promise is greatest, since it may bring electrically the musical accompaniment of the biggest city theater or the entertainment of the metropolitan vaudeville or dramatic stages, word for word, and at but a fraction of the cost of importing the talent or musicians for such a class of program.

An example of the extent to which these and other electrical appurtenances may be used to take the place of expensive features of large city houses is found perhaps in its most complete form in the new Tower Theater in Los Angeles. Located on a small lot in the heart of the business and shopping district, at Eighth and Broadway, and with no space to be lost in seating capacity, not even enough to provide facilities for a building above the theater, the owner, H. L. Gumbinger, the architect, S. Charles Lee, the electrical engineer, Arthur F. Buss, and the electrical contractor, Bert L. Perry, Inc., all of Los Angeles, worked together to make the electrical features take the place of orchestra, supplementary entertainment, and to aid in the role of host in many extraordinary ways.

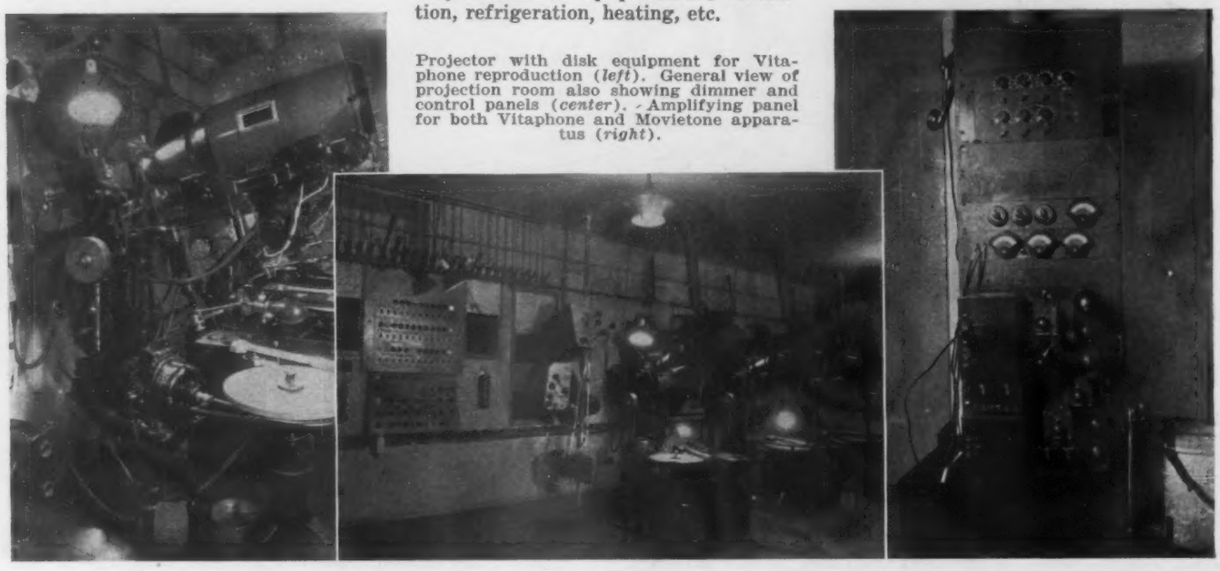
There was no room for a stage other than a procenium for screen and curtain in this theater. There was no room for an orchestra, only for an organ console. The limited seating capacity called for the use of all basement space as a lounge and waiting room, for rest rooms and a nursery for children. A sub-basement was used for the necessary mechanical equipment for ventilation, refrigeration, heating, etc.

The Tower Theater was being built just as the Vitaphone was launched and as the Movietone was in contemplation. The management immediately decided to use these for its entertainment features and musical accompaniment to pictures, when available, to supplement the organ. To entertain its waiting customers in the lounge and lobby it installed a public address system which would carry the music of either the organ or the reproducing system to those outside. To facilitate quick seating and communication of the location of vacant seats to the doorman, it installed a seat indicator system. These electrical features, in addition to elaborate house lighting, building floodlighting, and customary auxiliary motor equipment, make the theater perhaps the most completely electrically equipped house on the Pacific Coast, at least for its size.

The possibilities for the contractor in the development of this type of installation elsewhere will be evident from a further consideration of this theater's features. A brief description of the operation of the Vitaphone and Movietone apparatus as given by the Western Electric Company, in whose laboratories the equipment was evolved, will be useful in giving an idea of the equipment and facilities needed.

Methods of Recording

Two methods of recording for talking pictures are employed. In one, called the disk method, the record is on a disk similar to a phonograph record. This is used by Vitaphone. In the other, known as the



Projector with disk equipment for Vitaphone reproduction (*left*). General view of projection room also showing dimmer and control panels (*center*). Amplifying panel for both Vitaphone and Movietone apparatus (*right*).

Offer Possibilities

Musical Features Electrically

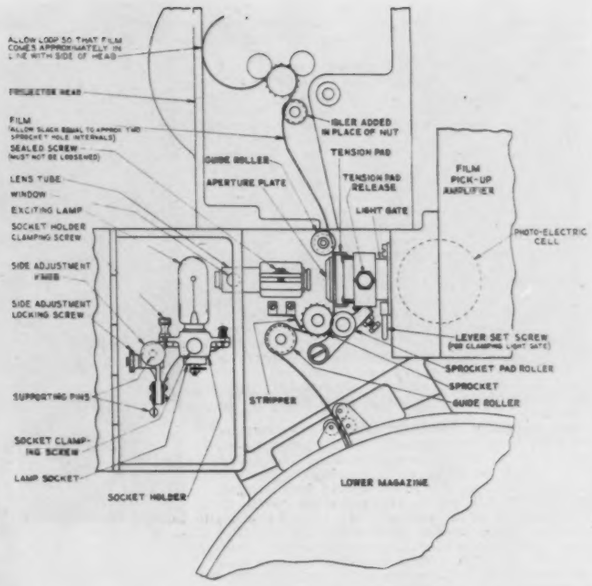


Diagram showing operation of film reproducing or Movietone pickup.

film method, the sound record is photographed on the film. Movietone employs this system. Theater equipment is available which can be used with either of these methods or both. The only difference lies in the pick-up apparatus used at the projector. The amplifiers and horns are identical in both systems. Productions of both types can be used on the same program, as a simple switching operation permits immediate change from one method to the other.

Recording is done electrically with both methods. The voice or music to be recorded is picked up by a microphone which generates a small electric current whose variations correspond to the sound waves. In disk recording this current controls an electro-magnetic recording stylus, whose movements cut the record on a wax disk in the usual manner, the undulations of the groove corresponding to the sound waves.

In film recording the amount of light falling on a moving film is made to vary in accordance with the fluctuations of the microphone current, and so a photographic record corresponding to these fluctuations, and therefore to the voice or music, becomes impressed on the film. The amount of light falling on the film can be varied, as just mentioned, by using the microphone current either to control the brightness of the lamp furnishing the light (the flashing lamp method) or else to open and close a narrow aperture through which the light reaches the film (light valve method).

Synchronous Reproduction

The first step in synchronous reproduction is to generate a small electric current whose variations correspond to the sound waves forming the voice or music that was recorded. Depending on which of the two previously mentioned methods of recording was used, this current is obtained either from an electrical reproducer playing on a disk record, or from a film reproducing attachment through which the film passes on leaving the projector head.

Disk Records—The disk records used are similar to the best types of phonograph records except that they are much larger and run about half standard speed; this enables each record to play throughout a whole reel. The film used with the disk record, called a synchronized film, is similar to an ordinary film, except that one frame at the beginning is specially marked to give the starting point.

Film Records—With the film method, the sound record consists of a band about $\frac{1}{8}$ in. wide, called a sound track, which runs down one side of the film and consists of microscopic lines. The spacing of these lines at each point depends upon the pitch of the sound which was recorded at that moment. The difference in density of the lines depends on the loudness of the sound—that is, the greater the contrast between light and dark lines, the louder the sound. Such a film is called a sound film, and is otherwise similar to an ordinary film.

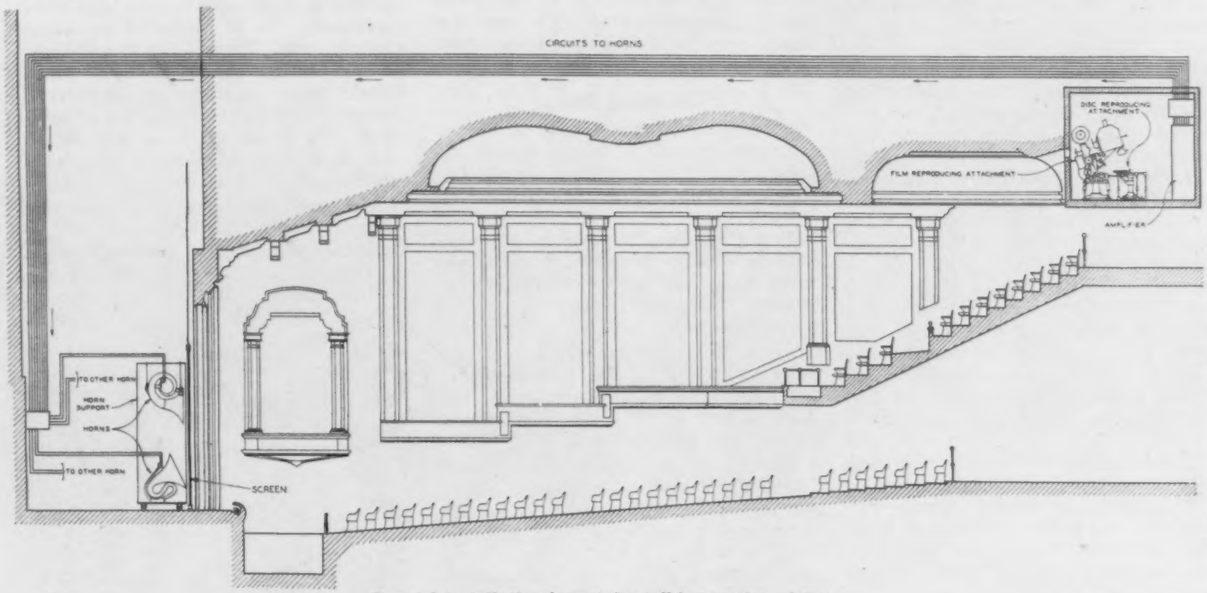
After leaving the lower sprocket of the projector head, the sound film enters the reproducing attachment, where it passes over a sprocket that moves it along at a constant speed. A narrow beam of light from a high intensity exciting lamp is focused on the sound track of the film through a system of lenses and an aperture plate. The light which has passed through the moving film will then vary in intensity according to the variations of the lines recorded on the sound track. This light falls on a photo-electric cell, which produces a small electric current whose variations correspond to the light, and therefore to the sound which was recorded.

Amplification—The small current from the electrical reproducer or the photo-electric cell, as the case may be, passes along to one or more vacuum tube amplifiers similar in principle to those used in the audio-frequency stages of radio sets. These amplifiers deliver a greatly magnified copy of this current.

Sound Projectors—The current from the amplifiers is converted into sound by means of sound projectors consisting of receivers and horns located at the screen, as shown in accompanying diagrams. The number of horns used, and their exact location, depend on the size and acoustic properties of the house. Usually a special type of screen is employed, which reflects light well and enables a good picture to be obtained but is practically transparent to sound waves. The horns are placed immediately behind the screen so that a perfect illusion that the voice or music is coming from the speakers seen on the screen is obtained.

Synchronism—In the disk method, perfect syncronism between sound and picture is assured by having the projector and the turntable carrying the record driven by the same motor; hence if the film and record are started together they must necessarily keep in step throughout the remainder of the reel.

In the film method the fact that the sound record is on the same film with the picture makes synchronism inherent pro-



General installation layout for talking motion pictures.

vided that the film is set up in the attachment with the proper loops to ensure that when a picture is at the picture aperture in the projector head the accompanying portion of the sound track will be at the light aperture in the reproducing attachment.

Fader—By using two projectors alternately, a continuous program can be run just as with ordinary pictures. A device called a fader is employed in making the transition from one machine to the other, which can be effected with no break in the sound. All that is necessary for this purpose is to turn the fader knob when the incoming machine is started. Auxiliary fader positions permit making the change from any projector position. At the end of each record or sound film the music overlaps the opening notes of the next, so that with proper operation the audience is unaware of any change being made. The volume of sound heard in the theater is also controlled by means of the fader.

Speed Regulation—The film reproduction system, as will be seen in the illustrations, is driven through gears and universal joints from the forward end of the motor while the turntable is similarly driven from the rear end.

In ordinary moving picture projection, the film is shown usually at a faster speed than that at which it was taken. However, this cannot be done with a synchronized or a sound film, as the pitch would be changed and this would cause the voice or music to be distorted and spoiled. All synchronous subjects have to be shown at exactly the same speed at which they were made, that is 90 ft. per min. This speed is maintained automatically by means of a special type of motor and an electrical governing system contained in the motor control box.

To permit of running the ordinary unsynchronized film in the usual manner, means are provided on the motor control box for regulating the speed within the usual range employed in projection.

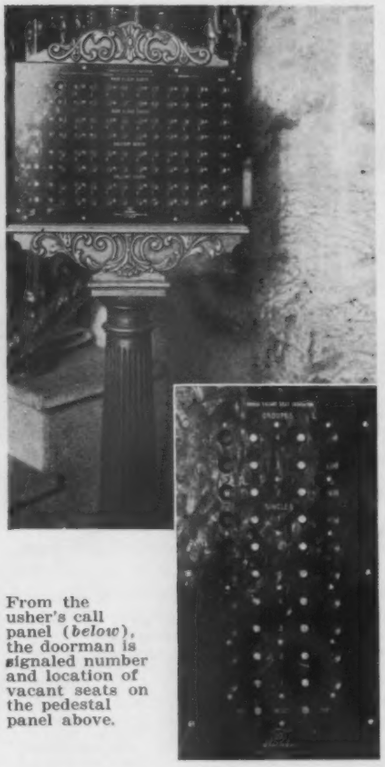
Mechanical Filter—In all mechanical equipment using gears, etc., vibrations and speed fluctuations are produced. Even when the most accurate manufacturing processes have reduced such disturbances to a point where they would be quite negligible in any ordinary mechanism their effects, in the case of apparatus for sound reproduction, might be noticeable to the listener as a kind of flutter or tremolo. The effect is completely eliminated, in both the disk and film reproducing attachments, by means of special spring drive systems for the turntable and the film sprocket respectively. This important refinement is called a mechanical filter.

Re-broadcasting Equipment

An interesting feature of the Tower Theater is the Vitaphone broadcasting equipment. Under the terms of the regular Vitaphone leasing contract all reproducing units (except the monitor, located in projection room) must be located in the auditorium of the theater. At the Tower Theater Mr. Gumbinger desired to broadcast the Vitaphone reproductions at certain points on the exterior of the building in order to attract possible patrons. He was also desirous of installing the broadcasting equipment in the lounge, the mothers' glassed-in room in the balcony, the ladies' retiring room and the nursery.

The contract restriction was overcome in a simple but ingenious manner. A complete system of re-broadcasting equipment, with Western Electric amplifier, was installed, with a microphone suspended directly in front of the Vitaphone reproducer (but not attached thereto in any manner except by sound waves) and loud speakers were located in front of the building over the marquise, in the theater foyer, in the lounge, in the ladies' rest room, nursery, etc.

A loud speaker unit was also located in the projection room thus giving the operator instant warning should the Vitaphone unit cease to function. This re-broadcasting equipment is used also to transmit the organ music to the public through the speaker units.



From the usher's call panel (*below*), the doorman is signaled number and location of vacant seats on the pedestal panel above.

Seat Indicator

The electrical installation of the modern theater includes many features which are designed to contribute to the comfort and convenience of the patrons. Among these may be mentioned the electric vacant seat indicator, a device for assisting the doorman in admitting patrons only when vacant seats are available. The accompanying photographs show the annunciator located in the lobby adjacent to the doorman's station, as well as the usher's calling station, whereby the head usher indicates to the doorman when seats are vacant and the position in the house where they are located. The indicator lights may be extinguished by either the usher or the doorman.

Operating Room

Other photographs show the operating room, containing the projection machines, panel for control of houselights, dimmer control handles, machine control panel, etc. The open wiring gutter (temporarily opened for work) indicates the number of wires necessary for the operation and control of the projection equipment of the modern picture theater.

All switches on house lighting circuits are provided with pilot lights of the same color as the light controlled. Also all machine motors, dousers and signals are provided with pilot lights.

All fuses throughout the Tower Theater are provided with pilot lights. An inspection of the pictures reveals the adequate system of vents provided for carrying off all heat or flames from the machines should the film become accidentally ignited. The Vitaphone disk record table and reproducing arm are clearly shown adjacent to each machine.

This theater is completely equipped with Major equipment. Floodlights are used on the main ceiling, while three color strips are used under the balcony and on side walls. Floodlights and border lights are also used. A large amount of decorative lighting is made use of, the front marquise alone being provided with 48 kw. Over 56,000 ft. of conduit of all sizes was used, and more than 100 miles of wire was needed to complete the installation. The elaborateness of this theater may be judged when it is stated that although the seating capacity is only 900, the cost of erection exceeded $750 per seat.

The installation was made by Bert L. Perry, Inc., of Los Angeles, under the personal supervision of J. E. Chandler, who aided in planning many of the electrical features progressively as the theater was under construction.

Wilcox Book Valuable to Contractor-Dealer

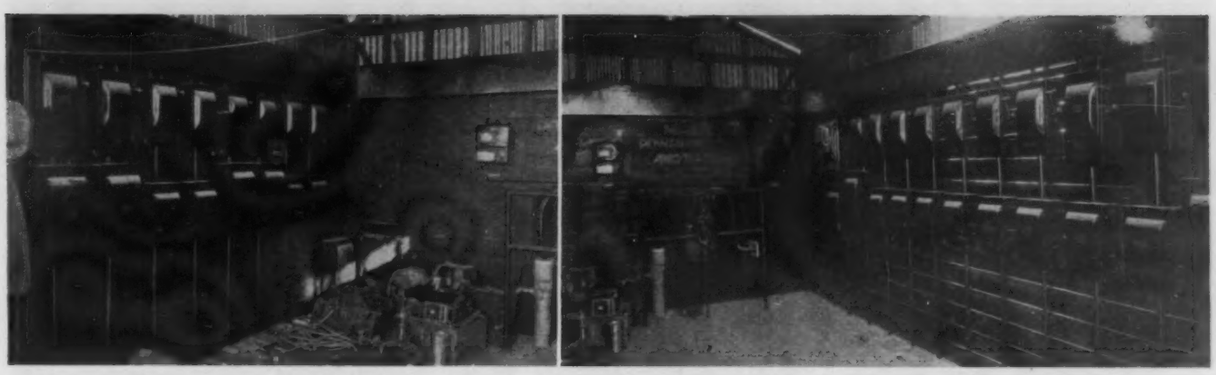
With the growing importance of electric heat, not only in industry but in the home as well, the book "Electric Heating," written by Edgar A. Wilcox, consulting engineer of San Francisco, and published recently by the McGraw-Hill Book Company, should prove of particular value as a working data handbook.

Not a technical book in the ordinary sense, in that it is written to be of use to and easily understood by the salesman of electric heating, by the contractor, the dealer and the power company man, the information in it should be of unique value in its accessible form.

The book starts with an introduction giving some history of the electric heat idea and outlines the general advantages, the conversion efficiency, control possibilities, comparable costs with other fuels and a list of means of producing electric heat. Then follows a chapter on the fundamentals of heat which should make it easy for anyone to understand the whole principle of operation. The number of valuble tables and diagrams included in the book make it especially usable.

A chapter on electrical fundamentals as related to electric heating is also included. From then on the book treats of the various types of elements or heating units. Then it takes up each of the various applications of electric heat in detail.

Chapter headings are: Cooking, Water Heating, Air Heating of Residences and Offices, Oven Heating, Heating Furnaces, Iron and Steel Melting Furnaces, Brass Melting Furnaces, High Frequency Furnaces, Pot Furnaces, Miscellaneous Furnace Applications, Arc Welding, Resistance Welding, Metal Heaters, Sterilizers, Stills and Steam Boilers, Liquid Heating and Compound Melting Pots, Incubators and Brooders, Miscellaneous Heating Appliances, Metal Coatings, Temperature Measurement and Control, Thermal Insulation, and an apppendix containing much in the way of contributary information of value in making estimates for electric heating applications.



On each wall of the control cabin, shown below at (A), are grouped the main switches and autostarters for each motor, the rock machines having one wall, the sand machines the other. All switches and gutters are neatly lettered and numbered.

Control Features Devised for Safe Operation of Gravel Plant

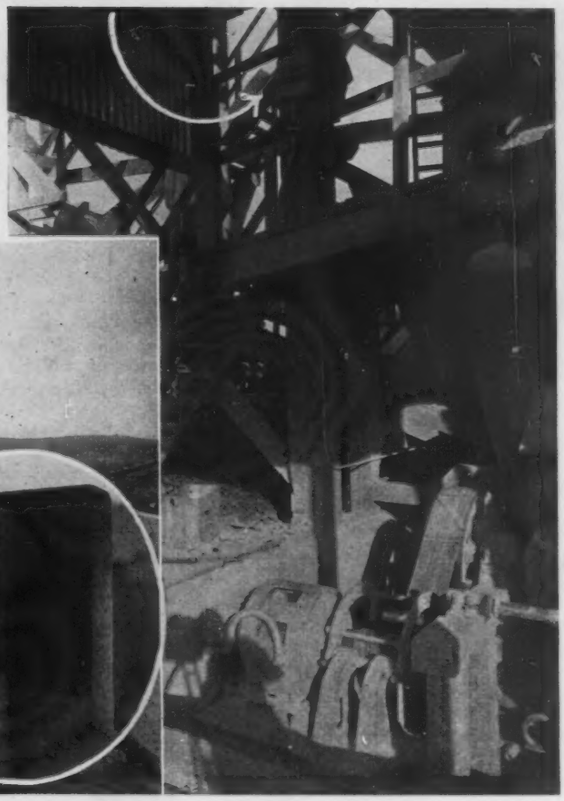
MACHINERY for handling rock and gravel is no respector of persons. Anything that falls in its hoppers "is grist for the mill." Therefore, to prevent accidents in all possible ways George Adams Roalfe, consulting engineer for the Otay River Rock & Sand Plant of the Spreckels Commercial Company, San Diego, enlisted the aid of the electrical contractors, the California Electric Works, San Diego, to make the electrical installation foolproof. The accompanying pictures show some ingenious and workmanlike methods employed.

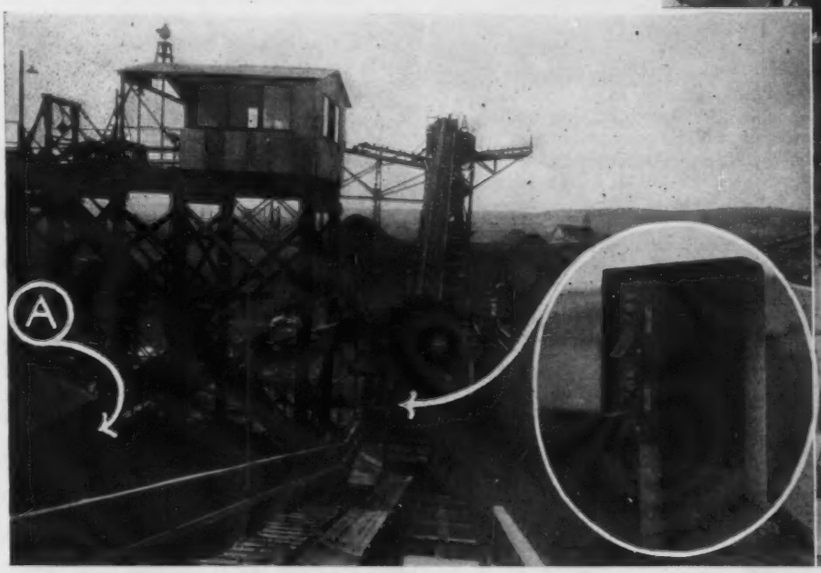
All motors are on automatic control. The special feature of the control is that two push buttons are used, one in the control house near the main switchboard, the other, or stopping and locking button, near the motor itself. Thus, if a motor must be shut down to clear out the flow line at any point in production, the local button is shut down and locked. The motor cannot be restarted until the lock is released. This prevents starting of equipment while men are in the machinery clearing trouble.

The lock is devised by attaching to the faceplate of the control button box a simple, inexpensive brass hasp and staple. When the hasp is forced over the staple to be locked by padlock or stick, the hasp pushes the stop button in and keeps it in, preventing closing of the motor circuit until the hasp is released.

The plant is designed to handle 1,000 tons of material each 8-hr. shift, but the plant is operated 24 hr. daily, running as high as 1,500 tons per shift. The lighting for night work is extensive, all units being hung on spring hangers to eliminate vibration at the lamp. The switchboard has 600-hp. capacity, of which 500 hp. is now connected.

Above, the series of bush buttons at the window ledge that control all machines. These are located in control house (A) below. Inset shows lock device on each local control button. Arrows point to locations of local button controls.





Seattle skyline at night showing the effect of the brightly floodlighted Medical-Dental Building.

Graded Intensity Effective in Building Floodlighting

EACH building to be floodlighted must of course be treated separately. In some instances the building is so modeled that an even flux of light over its entire surface would make a most interesting job. It is the consensus of opinion among many floodlighting experts that the lighting should be graduated from a low intensity at the base to a high intensity at the top.

This method of lighting gives weight to a building which is lacking if the floodlighting is done so as to give an even intensity, these authorities maintain. The view of a floodlighted building is largely from the street so that this method of floodlighting gives the best results from that angle of vision.

With the light intensity graded from .5 at the base to 15 foot-candles at the top, the floodlighting of the Medical-Dental Building, Seattle, is declared almost ideal.

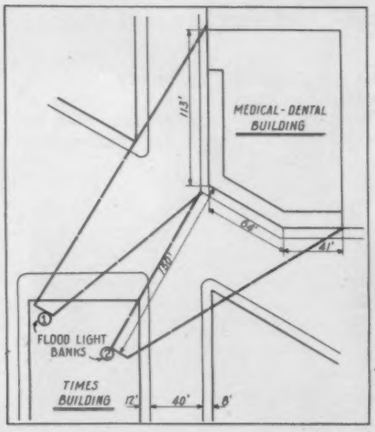
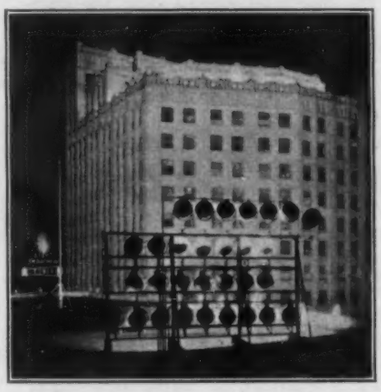


Diagram showing placing of floodlighting banks and distribution of lights over the building.

The Medical-Dental Building in Seattle, recently floodlighted under the direction of Lyman D. Morgan, illuminating engineer, Pittsburgh Reflector Company, was accomplished in such a manner from two banks of floodlights placed in a position as shown in the accompanying sketch on roofs of buildings across the street. The building is illuminated to an intensity of approximately .5 of a foot-candle at the base, graduating to between 12 and 15 foot-candles at the top. The effect is that of "a beautiful white fairy castle, its pinnacles of fire silhouetted against the blue Puget Sound skies," or at least that is the way it looks to one of Seattle's artistic architects.

The floodlighting bank consists of 87 floodlights. The effect of the lighting can best be judged by the accompanying photographs.



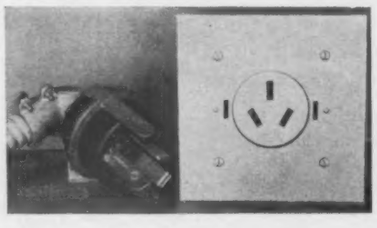
A battery of flood lights containing seven 500 and twenty-three 1,000-watt units on the Medical-Dental Building, Seattle.

The installation was made by George R. Cooley Company. A total of over 70 kw. is connected in the installation; 500-watt and 1,000-watt units are used.

New Approved Range Plug to Solve the Disconnect Switch Problem

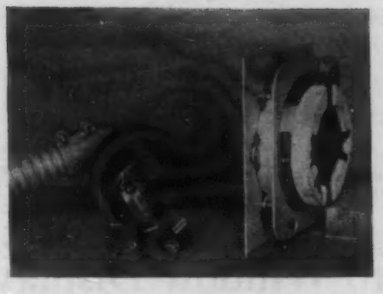
AFTER satisfying the electrical committee, N.F.P.A., in charge of revision of the National Electrical Code, a standard range plug as shown in the accompanying pictures will be approved in the new 1928 code to take the place of the disconnecting switch at the range now required.

All manufacturers intend to bring out this standard plug, which fits into a neat aluminum plate and porcelain receptacle. It is made with the ground leg slightly longer so as to make first contact, and is held in place by two long side guides.



In this and the other two accompanying pictures may be seen various features of the new plug.

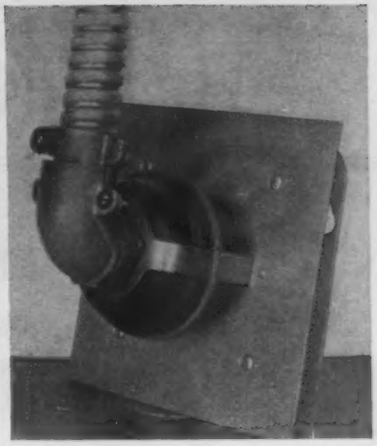
This plug, soon to be on the market, was incorporated on the demonstration board made up by the Rowley Electric Company, Electragists of Pasadena, for the recent P.C.E.A. convention to demonstrate the simplicity of the Minimum Range Wiring Standard approved by the California Association of Electrical Inspectors for one year's field test.



The object of the standard plug is obvious. It makes for portability of the electric range, so that the customer, in moving from one residence to another, may pull the plug from the receptacle and at the new home, plug it into the receptacle there. It is recognized that until more homes are wired with this standard plug receptacle this ideal condition will not obtain, but as the sales efforts of the industry increase it is felt that the percentage of homes so wired will increase yearly until every home will be equipped with this receptacle, even as it is now piped for gas.

For the housewife another advantage is added. The range may be disconnected at will to clean around it and then reconnected easily. In Spokane, where over 9,000 ranges have been connected with standard plugs of an older design, this feature is now enjoyed by the public.

For the electrical contractor the receptacle has the feature of making a neat job, of being easier to sell to the customer than a separate switch, and of elimination of trouble calls to move or disconnect or alter the position of the range.



Estimating Ventilation for Churches and Public Buildings

By J. R. Wilson*, Quality Electric Works, Los Angeles.

Electrical Estimating Series—XXXVIII

IT would be the natural supposition that, due to high ceilings and large cubical contents per person, churches as a rule would be properly ventilated. However, this is seldom the case and churches offer a fertile field for installation of ventilation equipment.

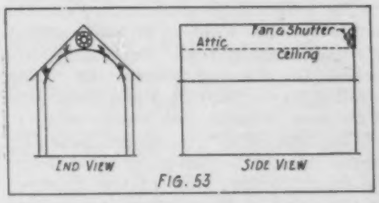


FIG. 53

Church Ventilation

Most churches depend upon natural ventilation provided by high windows which are opened slightly at top and bottom. To say the least this is a crude method and causes violent drafts during winter months. In the summer time there is lack of sufficient circulation due to the slight difference in temperature between indoors and outdoors.

As shown in Fig. 53 a very simple and effective method of mechanical ventilation can be installed in almost any church. Church construction is usually basically typical, consisting of inner and outer walls with an air chamber space between. By installing the fan either at the front or rear of the attic space, as shown, and providing registers at the points desired, an efficient system of ventilation will result. It also will have the advantage of quietness of fan operation and by properly placing the fan all danger of objectionable sound in the auditorium will be eliminated.

The registers should be placed in the ceiling in the same manner as recommended for lodge halls (see Figs. 14 and 15, Electrical West, Feb. 1, 1928, p. 106) and for theater ventilation (Electrical West, April 1, 1928, p. 309). The same method of figuring register sizes also applies. On the outside of the fan should be placed an automatic shutter to open and close with operation of the fan. For year-round ventilation a five-minute air change should be figured for churches. In extremely cold weather the fan may be operated only as needed.

Office ventilation installation.

Public Buildings

In the ventilating of public buildings, such as hotels, office buildings, etc., the newer type of construction has created a condition which makes the application of modern ventilating equipment a comparatively simple matter. As a rule toilets and bathrooms are located on each floor with ventilating flues running to a common attic space, as shown in Fig. 54. Former practice called for some very costly systems of ventilating equipment in order properly to ventilate these rooms. In recent years a new system has come into use.

It has been found that efficient use can be made of the aforementioned flues and attic space to provide an effective system of ventilation. By installing a power roof ventilator A, or placing fans in the outside walls of the attic space B, the fans will draw all heat and odors to the outside of the building. Ordinarily a five-minute air change for toilets and bathrooms will be sufficient. The way to calculate the proper size of fan for a system of this kind is to figure the cubical contents of all bath and toilet rooms connected to the attic space. Divide the total by five and the result will give the amount of air the fans should handle to create a five-minute change.

The ducts or flues are usually built in at the time the building is constructed. Where this is not the case galvanized vertical ducts can be run through the bathrooms from floor to floor and connected to the attic space. A register of proper size is installed where the ducts pass through the rooms. In the ordinary floor-to-floor job propeller fans do the work very well, but if much flue resistance is present, due to many bends, it is best to figure on a blower installation. This can be installed in a similar manner. This is a very economical system to install and the results obtained will be correct.

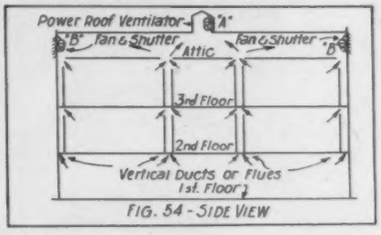


FIG. 54 - SIDE VIEW

* All rights reserved by the author.

Better Merchandising

New Electrical "Mysteries" as Applied to Window Display

How a Clever Merchandiser of Radio Used Latest Vacuum Tube Development to Animate an Unusual Window Display and Attract Crowds

ANIMATION, as a means of attracting attention to a window display, is an old and tried method. Vacuum tube development in the operation of machines is extremely new. And since good showmanship depends upon giving new twists to old methods, using the newest in an old and tried appeal, what is more appropriate than that the two be combined in window display by an electrical dealer.

E. A. Portal, successful because inventive and creative in his merchandising methods, is a dealer in radios, records and now home movie outfits. His store is on Geary St., San Francisco, next door to one popular theater and near a second. His windows, he has always felt, are his best salesmen. An opportunity never passes him for making unique and effective use of his two small but startegically located windows in the line of march of theater crowds.

Invention is no less important in devising an attention getting window than it is for the improvement of the merchandise itself.

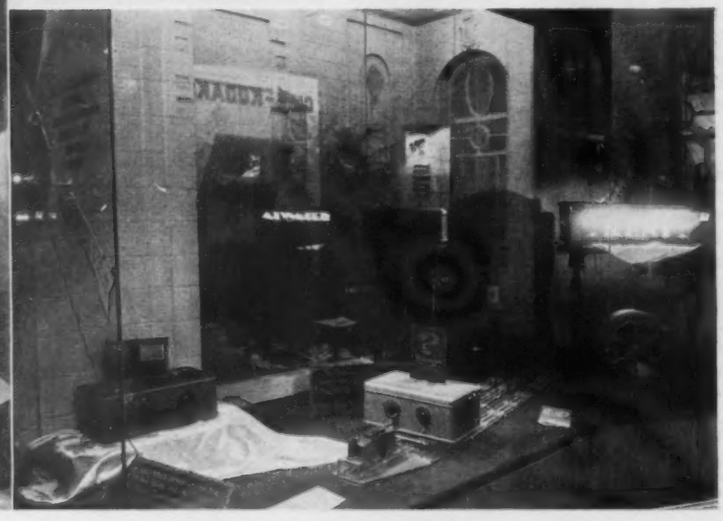
Bart Silver, head of the technical department of the E. A. Portal Company, Inc., follows every new development in radio and vacuum tube research. When the Westinghouse laboratories announced the recently developed grid-glow tube, he sent for one, not with any definite idea of what he could use it for but because doubtless it should be very useful somehow.

Between Mr. Portal and Mr. Silver there was evolved a window display. Mr. Portal, the merchandiser, contributed the well tried principle and the familiar objects, Mr. Silver contributing a new electrical method of operating them.

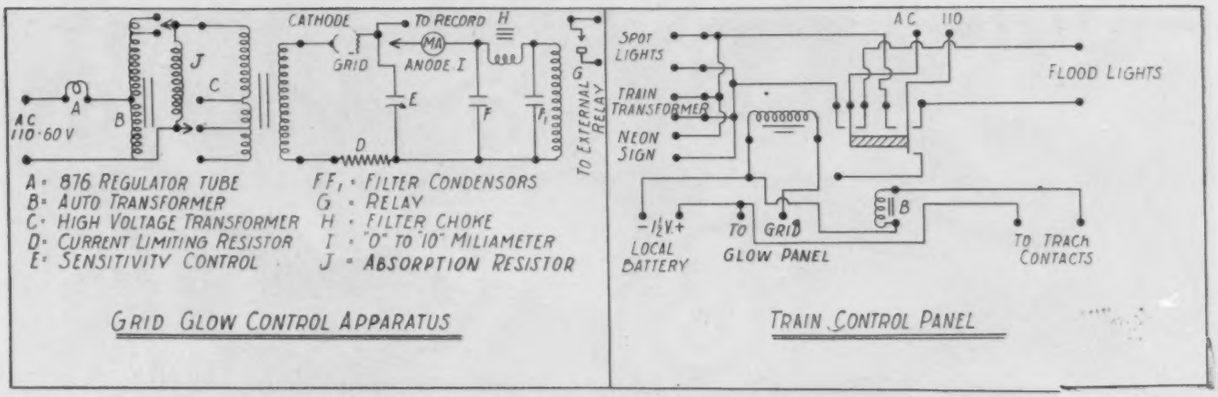
The resulting window contained a phonograph record, a small electric train bearing a radio set and a portable neon sign, all ordinary window dressings. The record was pasted against the inside of the front window. From it ran a silk cord to a sign urging the passerby to step to the window and place his hand near the center of the record, which was inside the window.

Immediately after he did so a remarkable series of events took place. First the entire lighting of the window changed from white to a red tint. Then the neon sign at the rear flashed on. On the floor of the window, at the rear, sat a small electric train locomotive, attached to three flat cars on three parallel tracks bearing upon them one of the new electric model radio sets.

When the hand was placed near the record this train started to move down the track to the front of the window. At the front of the window it reversed and the train drove back to the rear of the window, whence all returned to normal. The white lights flashed on again, the neon sign turned off. The entire window was ready for the next person that placed his hand near the window.



At left, cards pointing to the phonograph record on the window; and below, the entire window, showing record at left, train on the floor in foreground, and the neon sign at rear, the latter two being operated "mysteriously" by placing the hand outside the window near the record.



Schematic drawing of hook-up for control apparatus and for train operation.

Naturally this mysterious, supersensitive operation aroused attention. Great crowds gathered around the window to try it. Moreover it brought numbers into the store to ask questions and thence to be interested in the attractive radio display inside.

The operation of the device was due not to mysterious causes, however, but to complicated applications of modern control mechanisms. Mr. Silver, who worked out the electrical operation, describes the principles as follows:

What Made it Work

The window display utilizes a laboratory product, the Westinghouse grid-glow tube, for the basic idea of its operation, together with a special control panel.

This grid-glow tube is a device similar in appearance to the commercial vacuum tube but in which there are three elements, anode, cathode and grid. The theory of operation is that with normal voltage applied across anode and cathode there is a slight electronic discharge which results in the collection of a negative charge on the grid. This negative charge is of sufficient amount to paralyse the operation of the tube and hence there is practically no current flow between cathode and anode.

When a body is brought near any device connected to this grid the negative charge on the grid is induced in that body. (An unbalanced condenser effect exists until the body is brought near the object connected to the grid. When the body is brought near, the negative charge is induced in it, thus balancing the condenser.) The result is that current flows once more from the anode to cathode.

By a system of relays this current may be made to operate any electrical device. It is not necessary actually to touch the control apparatus. Merely bringing the hand near it, for instance, is enough to relieve the charge on the grid and cause the device to operate.

In this particular installation use is made of a compound relay which enables the train to complete its cycle of operation whether the hand is kept near the control (in this case the record on the window) for only a moment or longer.

To afford more sensitive operation a foil plate was placed on the label of the record. This was placed on the side away from the window and covered with an extra label glued over it. A very fine wire was concealed in the twisted silk cord running to the sign from the back of the record (and the foil plate). This wire was continued behind the sign to the grid of the tube.

Other Uses in Animation

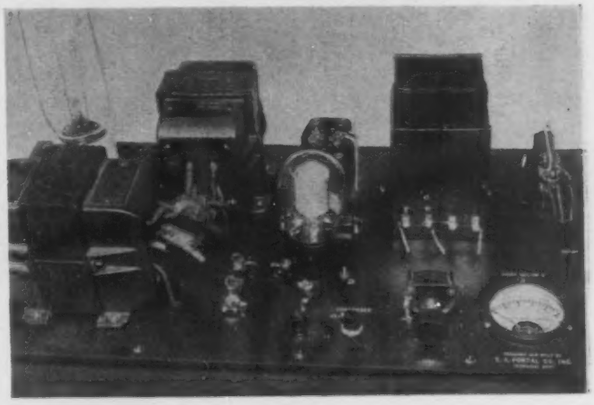
To illustrate that the device is not limited in its application to this particular animation, it was used in an ingenious device displayed at the P.C.E.A. convention at Pasadena recently. A mechanical bull dog, ordinarily made to growl by means of a manually operated bellows blowing through a reed, was arranged to operate by means of an electric magnet device which was set in motion by a relay which the grid-glow apparatus of Mr. Silver caused to be energized. In this case the control was a foil plate fastened to and concealed under the bottom of a plate of bones set in front of the dog. As anyone brought a hand near the plate of bones the mechanism was energized and the dog caused to growl very realistically.

Modernistic view of the very modern radio shop and its futuristic window, with theater crowds making the mechanism operate.

Mr. Portal plans to make use of the principal in other animated window displays. Its possibilities, he says, are beyond imagination. It only remains for the merchandiser to devise new stunts for it to operate.

Moving trains in windows always attract attention. Moving figures or live people always attract big crowds. The possibilties with this simple device, which by means of a required number of relays can be made to operate any series of mechanisms, opens up new channels for window display methods which should come appropriately from the electrical merchant.

New Display Room for B.C. Electric —Construction work on the new showroom building for the British Columbia Electric Railway Company is nearing completion, but the elaborate wiring and electrical installation of the building, as well as other interior work, will not be finished for some time yet. The company expects to be installed in the new building at Dunsmuir and Granville Sts. by Sept. 1.



Control panel utilizing the grid-glow tube for the operation of relays.

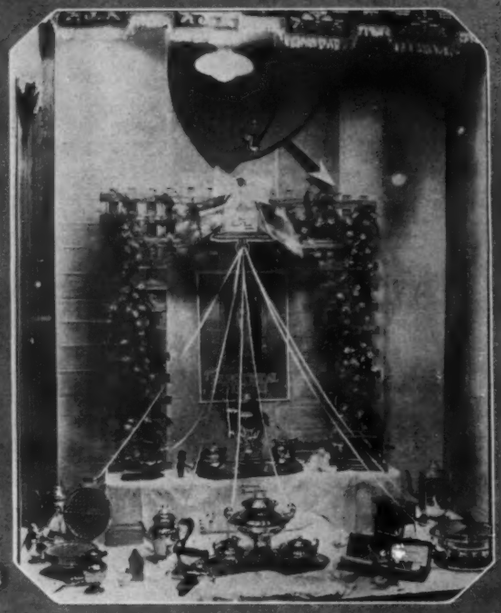
June Bride Prize Windows

1

2

Winners in Order of Awards

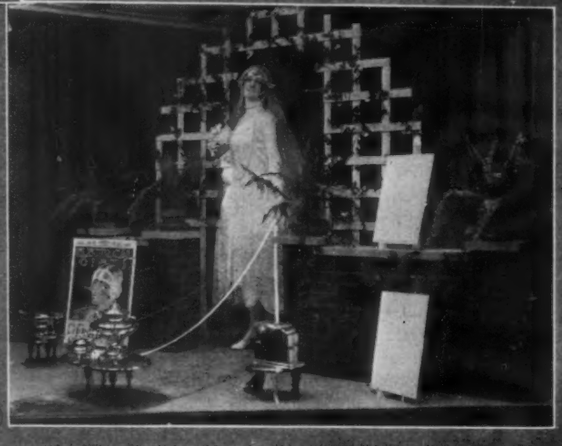
SCOTT-BUTTNER Electric, Oakland, won first prize in this year's California Electrical Bureau June Bride window contest, declared the best contest ever. Just-Rite Electric, Watsonville, former winner, won second; Baker Ave. Electric, of Bell, third; Central Electric, Watsonville, fourth; Golden Gate Electric, San Francisco, fifth; and Mission Electric, Santa Barbara, sixth. Full details will be published later.



3

5

4



6

No Saturation in Utah

Not When 1,841 Washing Machines Can Be Sold in One Month.

The company's Salt Lake salesroom as it appeared while the sale was on.

"THERE ain't no such figure!"

This was the skeptical comment of one of the city's prominent citizens as he stood in front of the Utah Power & Light Company's Salt Lake store on April 2. Emblazoned there on the front window, in no uncertain terms, was the triumphant declaration that the company had sold 1,841 washing machines during the month of March.

Even to those of the organization who had kept in close touch, day by day, with the sales reports, such an astonishing total was almost unbelievable. After the smoke had cleared away, however, and conditions again were normal, the figure stood as absolutely authentic. A new record in washer sales had been established.

And now, how was it done?

In conducting an intensive drive, such as this one, it is, of course, always the desire of those directly connected with it to get better results than in any previous year; but in glancing back into the figures of past washer campaigns the fact became well established that there was a big job ahead to make history repeat itself. Particularly was this true when it was noted that the company had a high record of 1,711 machines sold in March, 1920.

A sales quota was established as follows:

Division	Quota
Bingham	45
Evanston	8
Green River	12
Idaho Falls	70
Logan	105
Ogden	180
Park City	30
Provo	105
Salt Lake	400
Western Colorado	45
Total	1,000

Now glance at the tabulation below, and see what happened to this sales quota:

Division	Quota	Total Sales for month	Percentage of Quota secured
Bingham	45	79	175
Evanston	8	43	537
Green River	12	42	350
Idaho Falls	70	243	347
Logan	105	180	171
Ogden	180	290	161
Park City	30	65	217
Provo	105	370	352
Salt Lake	400	457	114
Western Colorado	45	72	160
Total	1,000	1,841	184

Let's get behind the scenes—in the Provo division, for instance. What's that we see? Look out! Here they come! A donkey—a horse—a cow. As the opening gun is fired on the morning of March 1 these three well known and highly domesticated members of

This advertisement announced the opening of the sale. It was one of a series used during the campaign.

the animal kingdom embark on a race that would make the Kentucky Derby look like molasses in January. As we read the score card we find that the donkey is the operating department, the horse is the sales department, and the cow is the accounting department. Each and every member of the Provo division was represented in these three groups, and every employee sold at least one washing machine! In the final count the accounting department had the highest score—and again, that's doing things in an unusual way.

In the Ogden division there was a close and exciting race between the "Buicks," the "Packards" and the Cadillacs." The "Buick" team, headed by Enoch Bingham, took the final honors, with a total of 113 machines sold.

A daily prize drawing was conducted in all divisions, in which each sale entitled the seller to one chance.

In the Idaho Falls division interest was at fever heat because of the fact that a challenge had been hurled by the Provo division in the form of a five-dollar bet that it would reach quota before the Idaho Falls crew. The latter raised the bet to ten dollars and came back with an additional bet that Idaho Falls also would obtain a higher per cent of excess over quota than Provo. Incidentally, Idaho Falls lost both bets by narrow margins.

Three snappy publications, issued daily and known as Provo's "Minute Movies (Not Slow Motion)," Idaho Falls' "Bogie Buster," and Ogden's "Washer News," carried accounts of each day's happenings, fully illustrated, in these three divisions.

In every division there were numerous examples of unusual circumstances in closing sales, indicative of the intense interest being taken, not only by sales people but by members of various other departments. This interest actually spread to the general public, and the washer sale became the subject for discussion in many circles. There were actual instances of bets being made on the outside as to whether the company would or would not reach certain figures in sales. All employees were given an opportunity to participate, and many of them took advantage of the offer of $2 for each prospect turned in that resulted in a sale.

A total of 291 machines was sold during the first three days of the campaign, an average of 97 per day. At the end of the first six selling days 506 machines had been sold. On March 19 the total quota of 1,000 had been reached, and from then on the goal was a new world's record. Reports for the last day showed the remarkable figure of 278 machines sold, which brought the grand total to 1,841 for the month, exceeding by 130 the previous high record made in March, 1920.

An intensive advertising campaign featuring the Automatic washer was conducted during the entire month.

Ice Men and Electric Combine

in Portland for Second Year of Co-operative Campaign to Sell "Refrigeration"

C. C. Crawford, refrigerating engineer, P.E.P. Co., and president of the Refrigeration Trades Association of Portland, with a refrigerator full of prize letters and slogan entries.

WITH added publicity features in the form of prize contests for a campaign slogan and for ideas on the advantages of refrigeration, the Refrigeration Trades Association of Portland conducted its second spring educational campaign June 11-23.

The prize contests for the best slogan under ten words epitomizing the campaign idea, and for the best letter under 100 words on the subject of "Why We Should Use Refrigeration," had run from May 8 to 26, and resulted in the selection of the slogan, "Keep Well by Well-Kept Foods." This slogan was featured throughout the two-weeks campaign in June. Ideas from the winning letter, which stressed the indispensability of refrigeration "to sanitation, economy and household comfort," were used by members of the association in their individual advertising.

Sponsored by the Portland Oregonian, the contests brought out approximately 5,600 entries, of which 4,500 were for slogans, and 1,100 for letters. Five hundred dollars in cash prizes were offered, with a first prize of $100 in each division. Judging was by members of the state and city health boards and the city board of education. The publicity given to the announcement and progress of these contests and to the final award of the prizes was effective in focusing considerable public attention on refrigeration and its value in the community.

When the story of the electric refrigeration interests combining with the ice men in Portland was told in ELECTRICAL WEST *(Oct., 1928, p. 212), it was asked by the skeptical, "How long will it last?" This article describes how this year it is going on bigger than ever.*

Like that of last year, the campaign itself was educational in nature and was devoted to exploiting refrigeration in general, whether produced by ice or by any of the various types of mechanical devices. The advertising done by the association as such was confined to the use of the adopted slogan, with the word "Refrigerate" added, on posters designed for display in streets cars, store windows and sales floors. Individual advertising of member firms tied in with the campaign by using the slogan in the copy.

Membership in the Refrigeration Trades Association embraces the entire wide range of manufacturers, destributors and dealers in any commodity or device having a relationship to refrigeration of any sort. It includes the two power companies, the gas company, the ice manufacturing and distributing companies, all the large department and furniture stores, and makers and distributors of ice boxes, numbering 35 in all.

The idea back of the campaign and other co-operative advertising done by the association is to educate the community to the need for refrigeration of some sort in every home all the year round, and thus increase the prospects in every field of refrigeration service offered in the community. So successful was last year's effort in this respect, as indicated by increased business of ice men, ice box dealers and dealers in mechanical devices of all kinds, that it was not difficult to secure support for this year's campaign.

Campaign plans were laid early in the year at a dinner meeting sponsored by the two power companies, to which were invited all association members and interested persons outside the group.

A Handy Mark-Up Chart

How to Figure Profit

Experience has proven that but few business men have learned to properly figure profit. Remember that 20 per cent added to cost does not yield 20 per cent profit. Profit is properly figured on sales, and to make a 20 per cent profit you must add 25 per cent to cost.

Keep the following schedule before you and you will find it worth many dollars in the course of a year.

5	%	added to cost is	4¾	%	profit on selling price		
8⅓	%	" " " "	7	%	" " " "		
10	%	" " " "	9	%	" " " "		
12½	%	" " " "	11⅛	%	" " " "		
15	%	" " " "	13	%	" " " "		
16	⅔	%	" " " "	14¼	%	" " " "	
17½	%	" " " "	15	%	" " " "		
20	%	" " " "	16⅔	%	" " " "		
25	%	" " " "	20	%	" " " "		
30	%	" " " "	23	%	" " " "		
33⅓	%	" " " "	25	%	" " " "		
35	%	" " " "	26	%	" " " "		
37½	%	" " " "	27½	%	" " " "		
40	%	" " " "	28½	%	" " " "		
44	%	" " " "	31	%	" " " "		
50	%	" " " "	33⅓	%	" " " "		
55	%	" " " "	35½	%	" " " "		
60	%	" " " "	37½	%	" " " "		
65	%	" " " "	39½	%	" " " "		
66⅔	%	" " " "	40	%	" " " "		
70	%	" " " "	41	%	" " " "		
75	%	" " " "	42⅞	%	" " " "		
80	%	" " " "	44½	%	" " " "		
85	%	" " " "	46	%	" " " "		
90	%	" " " "	47½	%	" " " "		
100	%	" " " "	50	%	" " " "		

Study this diagram and think it over. On overhead of 20% of sales is assumed. The chances are that your overhead runs closer to 30% of sales.

A combination chart to aid quick calculation of mark-up for profit.

Merchandising Prospect Cards of Two California Utilities

MERCHANDISING DEPARTMENT
SAN DIEGO CONSOLIDATED GAS & ELECTRIC COMPANY

Name ..... No. .....
Date .....
Customer Purchased ..... (Appliance) Amount $ .....
Cash ..... Down Payment ..... Monthly Payment .....
Brought in for repair .....
Service Rendered .....
Customer desires following service .....
General Remarks: .....
Salesman
Remarks .....

RESIDENTIAL PROSPECT CARD
PACIFIC GAS AND ELECTRIC CO. DIV. ..... DIST. .....

INTERVIEWED	
NOT AT HOME	
KITCHEN LIGHT UNIT	
VACUUM CLEANER	
WASHER	
IRONER	
REFRIGERATOR	
ELECTRIC COOKER	
RANGE	
WATER HEATER	
AIR HEATER	
LAMP WATTAGE SOLD	
LAMP WATTAGE INCREASE	

SPECIAL INFORMATION WANTED BY CONSUMER:

DATE OF CALL
3 .....
2 .....
1 ..... SALESMAN

APPLIANCE DATA

APPLIANCE	IN USE	LEADS	APPLIANCE	IN USE	LEADS
Cookers			Percolators		
Curling Irons			Range		
Dish Washer			Refrigerator		
Fan			Sewing Machine		
Grill			Soldering Iron		
Hair Dryer			Toaster		
Heater			Vacuum Cleaner		
Heating Pad			Vibrator		
Hot Plate			Waffle Iron		
Ironing Machine			Washing Machine		
Irons			Water Heater		

Salesman to call back .....

	YES	NO
RENTER		
OWNER		

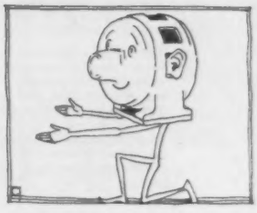
IF CONSUMER IS RENTER GIVE NAME OF OWNER OR AGENT
NAME ..... ADDRESS .....
OWNER'S AGENT ..... NAME ..... ADDRESS .....
REMARKS

An interesting comparison of prospect cards for electrical merchandising may be made by close examination of the items listed on the two cards whose front and reverse sides are reproduced above. That of the San Diego company was imprinted with the addressograph bill address and given to salesmen to take with them in making survey. The P. G. and E. card makes notation of whether the prospect is owner or renter of the property, since this information sometimes affects sales possibilities.

A ridiculous wage—

"Electricity Is Cheap—Use More of It"

Such excellent sales arguments were presented in each of the Three-Minute Speaking Contest speeches delivered at the recent P.C.E.A. convention that one will be printed here each month. The following speech won first prize for W. M. Fisher, Los Angeles Gas and Electric Corporation.



Begging for work—

WOULD you knowingly allow your wife or your mother to work for 3 cents an hour? Yet that is the ridiculous wage of any woman who does anything a small electric motor could do for her!

The figures are a revelation to most people. So it is with no little pleasure that we say to the woman who still does many unnecessary, tiresome tasks:

"Madam! Electricity will sweep your floors for 1¾ cents an hour! It will wash your clothes for 3 cents an hour, and pedal your sewing machine for ¾ of a cent an hour! It will cook for you, iron for you, warm you, cool you, clean for you and make your ice—at an average rate of only 3 cents an hour!"

Then, turning to the farmer, we say:

"Sir! Do you know that power and light for an entire dairy farm and its household costs only 35 cents a day? That for 10 cents electricity will milk 30 cows for two days, brood 40 chicks for six weeks, lift 5,000 gal. of water 100 ft., or grind 560 lb. of grain?"

To the manufacturer we prove that electricity will increase his production, decrease his costs, and make his factory cleaner and safer.

Finally, to the entire nation we point out the tremendous saving in natural resources through the use of electricity.

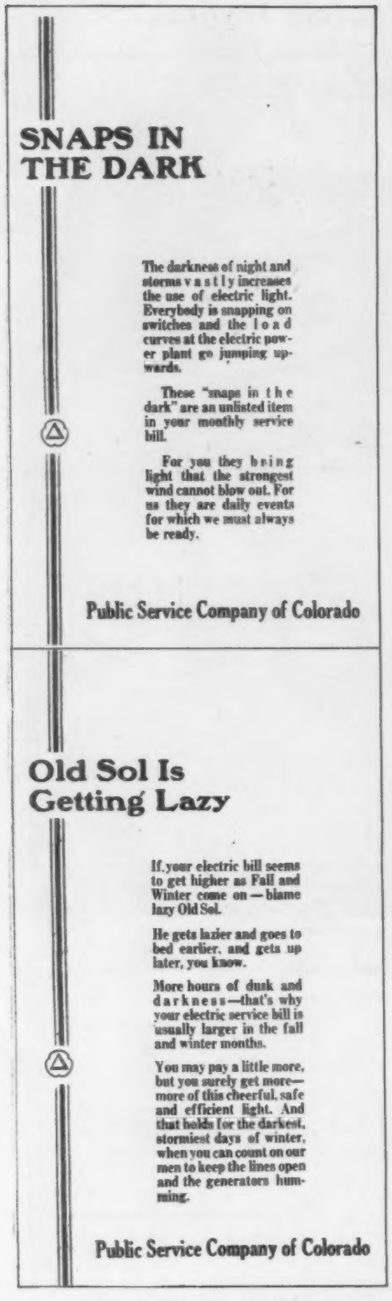
What, indeed, would become of America's miraculous quantity production and high wages without the cheap electric power that operates our factories? Truly, the astounding cheapness of electricity could be completely realized only if we were suddenly deprived of it.

Electric motors have well been likened to an army of willing slaves, begging the privilege of doing our hardest tasks—for 3 cents an hour! Each tiny motor, in the role of a smiling, ever-ready slave, comes bowing before us, pleading:

"Use me! For though the general cost of living has increased 65 per cent since 1914, I am even cheaper than I was then! And, as you increase my work, my cost becomes proportionately less! For economy and efficiency, for cleanliness, and for the sake of your health, **make use of me!**"

Needing no further proof, shall we not answer:

"Thanks, most worthy and welcome slaves! Gladly we'll use more of you!"


SNAPS IN THE DARK
The darkness of night and storms vastly increases the use of electric light. Everybody is snapping on switches and the load curves at the electric power plant go jumping upwards.
These "snaps in the dark" are an unlisted item in your monthly service bill.
For you they bring light that the strongest wind cannot blow out. For us they are daily events for which we must always be ready.
Public Service Company of Colorado
Old Sol Is Getting Lazy
If your electric bill seems to get higher as Fall and Winter come on — blame lazy Old Sol.
He gets lazier and goes to bed earlier, and gets up later, you know.
More hours of dusk and darkness—that's why your electric service bill is usually larger in the fall and winter months.
You may pay a little more, but you surely get more—more of this cheerful, safe and efficient light. And that holds for the darkest, stormiest days of winter, when you can count on our men to keep the lines open and the generators humming.
Public Service Company of Colorado

Two of the advertisements dealing in an institutional manner with problems of service. The story is told entertainingly and convincingly.

Making the Advertising

ACQUISITION of new properties by the Public Service Company of Colorado through aggressive campaigns has brought about an interesting situation with regard to the company's advertising administration. Outside of Denver many hundreds of square miles of sales territory have been added—twenty operating divisions in all. The publicity needs in these divisions varied greatly, both in general and sales advertising. The communities involved, some fifty, are widely scattered. Newspapers of widely different circulations, beginning with small weeklies with as low as 300, are the media available.

The company could not have in each operating division a publicity manager; obviously that was impractical. Nevertheless, the advertising of each division had to be conducted with special regard for local environment and continually changing local conditions. How was this to be accomplished?

The administration organization, whose work has met with consistent success, centralizes the publicity work, yet secures localized effort. E. K. Hartzell, assistant to Frank R. Jamison, publicity manager, is in charge. Mr. Hartzell writes some copy which appears in all newspapers in his territory —52 of them in 50 communities. But a great deal of advertising is prepared individually for operating divisions; a situation requiring special general and sales advertising may require many days of work right on the ground.

Advertising Appropriation Policies

Sales advertising of the Public Service Company is on the basis of from 2 to 3 per cent of gross sales. As each year starts the local sales manager is given his gross quota for the year and his advertising is expected to be no more than 3 per cent of this. The amount of advertising, of course, in terms of space, will vary a great deal from community to community.

In addition to this is the company's institutional or goodwill advertising. For this, in all divisions, including Denver, the company spends between 6/10 and ¾ of 1 per cent.

There is a great deal of variation in general advertising expenditures from territory to territory, outside of Denver. All divisions get some. When, however, a local franchise situation, for instance, calls for special effort—then general advertising is generously applied. Mr. Hartzell visits each operating division at least twice a year. Some divisions he gets to much oftener than this.

Conditions affecting both sales and general advertising are reported to the publicity department from the operating divisions by mail and by telephone. On the basis of close contact thus secured, advertising needed for the local territory is prepared and dispatched.

The Public Service Company spends much more for newspaper advertising than for any other kind; approximately 60 per cent of its appropriation is used for newspaper space. Circulars and direct-mail advertising take about 20 per cent, outdoor boards approximately 3 per cent; about 12 per cent is for program, souvenir and other miscellaneous advertising, and about the same percentage for administration.

A Problem With Many Small Newspapers

One of the problems the publicity department has had to contend with, and finally has worked out, was created by the numerous small newspapers in the territory. Some of these have extremely meagre equipment. None possess the facilities of large-city publications. Mr. Hartzell quickly learned that sending copy to these newspapers marked with specific instructions concerning type faces and sizes often resulted in trouble. There were no blanket instructions that the group of newspapers could meet, or come within a long way of meeting. Best results, he has found, come by leaving a great deal to the printers' judgment.

If proofs are sent, the newspaper is asked to duplicate the advertisement as nearly as it can. If a layout is sent, the lettering is done as the advertiser would like it, and the newspaper is asked to follow it as closely as it can. Type sizes are not marked, nor faces.

When advertisements are sent to the entire list of newspapers, or indeed to a group of any size within the entire list, advertisements are set in Denver. Either mats, electros, stereos or proofs are sent. The individual situation decides what is the best and most economical plan to follow.

The Best Days to Advertise

For good-will and institutional advertising, Mr. Hartzell uses Saturday and Monday issues of daily newspapers. The purpose is twofold. The publisher has small issues on these days usually and is especially pleased to receive the advertising. Further, the advertising does not come in competition, so to speak, with so much aggressive retail advertising.

Sales advertising, however, is most frequently placed in the best retail advertising issues, when other columns will contain aggressive advertising to secure customers. Much advertising appears in Thursday and Friday issues. Between 60 and 70 per cent of all sales advertising is done in approximately a ten-day period ending just before the discount does, beginning at the end of the preceding month.

For important sales advertising, the preferred size is three columns by 140 lines. This dominates the page. Other popular sizes are three columns by 10 in. and two columns by 8 or 10 in. Some of the special sales efforts have been promoted with advertising four columns by full depth of page.

A condition affecting newspaper advertising is the attitude of retailers handling appliances merchandised by the company. Too heavy advertising may lead to active complaints by retailers. The company does not buy

Fit the Town— *The Public Service Co. of Colorado Finds That It Pays*

position, but Mr. Hartzell says it receives more than an even break on it.

Proofs are not required of advertisements before publication. Proof reading is left to the newspaper. Under the existing conditions this is the only practical system, and it works out. Of hundreds of layouts sent to newspapers, the company's advertising department sees nothing until the published advertisement appears in the newspaper itself.

Some of the cities outside of Denver, such as Boulder, Sterling, Cheyenne and Grand Junction, have progressive local newspapers with considerable advertising patronage. On the other hand there are numerous very small weeklies. How good, from the productive sales standpoint, are such newspapers?

Mr. Hartzell speaks highly of them. Sales advertising is expected to get results. Terms, small down payments, special offers are used again and again with results. Frequently the company will run coupons in advertisements. The coupon is worth a dollar if brought to the company's salesroom to apply on a waffle iron or other appliance. Sometimes these advertisements produce not a single return coupon; at other times there is considerable response.

A good demonstration that this advertising pays occurred in January last when the quantity of sales advertising used was much below average. Throughout the territory the influence downward on the sales was noted.

It is worth mentioning that a considerable portion of the company's advertising is done in a territory which for a number of years has been worked very efficiently. The so-called western division, taking in Boulder, Fort Collins, Cheyenne and other towns, for years has made national records among Doherty properties. The saturation point on various appliances is more nearly reached there than in any other territory, probably, in the country. Nevertheless, sales in 1927 were far greater than in any previous year. The fact that there has been aggressive newspaper advertising, planned with thought for actual sales, undoubtedly enters into this. Mr. Hartzell declares without qualification that newspapers of small circulation in relatively small communities are good advertising mediums for the public utility.

"Holding Up" the Company?

Mr. Hartzell's goal is 100 per cent friendliness to his department by newspaper publishers in his territory, and he declares that the company has it now. Inevitably, from time to time, a local situation arises which must be straightened out. If correspondence is insufficient Mr. Hartzell may make a trip to the point of trouble. In all negotiations he has found the newspapers fair to a high degree.

Communities of Several Types

Communities of many different types are catered to outside of Denver by the Public Service Company of Colorado.

FEW public utilities in the West have done so extensive or so complete a job of advertising, or with as good results, as the Public Service Company of Colorado. This account of that company's advertising organization, its objectives and methods of handling the work, are worth close scrutiny because of the individual attention given each community.

Boulder is a university-tourist town; Leadville is in typical mountain mining country; Monte Vista, San Luis and other towns are in an agricultural intermountain valley. Around Grand Junction, on the western slope, there is extensive fruit growing. What formerly was an agricultural and educational center, Fort Collins, has had extensive oil discoveries during the past three and a half years.

The same sort of copy is written for one community as for another, both in respect to sales and much of the general advertising. If, however, a specific situation in general advertising arises it is, of course, given special, localized treatment. General advertising, when used for the entire out-of-Denver territory, usually is brief. The advertisements reproduced here are typical of the "general" advertisements used.

In sales advertising, the same "clincher"—low down payments, premiums, and the like—which are used for Denver promotion are employed throughout the territory. Stunt advertising is sometimes used as, before Christmas, when an airplane went out from Denver over northern Colorado towns, following publicity duly announcing the events, distributing special advertising literature.

The experience of the Public Service Company in the territory out of Denver, scattered and expansive as it is, has been that centralized management, providing ample opportunity for localized study and effort as the occasion arises, is practical and successful. The fact that the communities in question are perhaps hundreds of miles apart in some cases does not interfere with effective publicity administration. Newspapers throughout the territory give the publicity department full co-operation in respect to news stories supplied them by the company's publicity department.

Whipping An Annual Challenger
Every winter, old King Zero disputes the right of way of the electric transmission and distribution lines.
It's an annual fight which your electric service company successfully stages.
It's a big job and a costly one, to keep the lines clear of ice and snow. But your power and light company is right there, else you wouldn't be able to sit reading in the mellow glow of an electric lamp while the frosty wind howls around the house.
Public Service Company
OF COLORADO
Dividing Horses —Electrically
A kilowatt hour means the use of a kilowatt of electricity for sixty minutes. It is the same as one and one-third horsepower working for the same period of time. Sounds like veterinary magic, doesn't it? But this energy, which costs only a few cents, will put a delicate brown on your morning toast or cut a steel beam in two in a few seconds. A strong servant to be so gentle?
Public Service Company
OF COLORADO

Two more institutional advertisements written for easy understanding.

News of the Industry

To Protect Fish Oregon May Close Four Rivers

For the expressed purpose of preserving "for food and game fish propagation and recreational purposes," the Rogue, Umpqua, Mackenzie and Deschutes Rivers, in the State of Oregon, four acts have been proposed in that state closing those streams to any further filings for water appropriations for commercial purposes. Initiative petitions covering these bills, needing some 12,228 signatures to insure their places on the ballot of the November election, have been signed by approximately 17,000 voters and have been filed with the proper authorities.

These bills, similar in form except as to description of the river named in each, declare the maintenance of the rivers "free of encroachments by commercial interests for food and game fish propagation" a beneficial use thereof; prohibit diversion or appropriation of waters thereof for any purpose except navigation or fish propagation subject to vested rights and to rights of riparian owners for domestic use; and provide for the punishment of violators of the acts. All waters in the four streams heretofore appropriated and all rights now existing which may hereafter revert to the state for any cause are also withdrawn by provisions of the acts.

These measures, which were sponsored principally by fish and game associations and organizations throughout the state, have met with some objection from some chambers of commerce whose members believe that adequate industrial development in the state depends in part on the proper commercial utilization of the state's water power resources.

Edison Company to Erect 12-Story Building

Plans for a new office building for the Southern California Edison Company to be erected on the northwest corner of Fifth and Grand Sts., Los Angeles, have been made public. This location overlooks the Los Angeles Public Library and the Biltmore Hotel. Taking advantage of the natural elevation on this site, the architects have planned a height limit building (twelve stories) of the modern set-back style, which has met with such favorable acceptance and is rapidly becoming recognized as the typical American architecture for large buildings.

The Edison Building will occupy a lot 175 x 175 ft., and the combined floor area of the twelve stories will be 250,000 sq.ft., providing ample facilities for the company's present needs with a generous allowance for future expansion. Basement space will be utilized for a two-story garage with room for 100 cars. Passing through a beautiful loggia entrance on the corner, the visitor will come into a spacious corridor where sturdy columns will support a Spanish Renaissance ceiling. This

Artist's drawing of the proposed Edison Building in Los Angeles.

corridor will open into the elevator lobby in the center of the building, while back of the corridor will be banking room for the transaction of business by the investment department.

Provision for adequate electric appliance display rooms and a model kitchen is being made. Electrical equipment of the most modern type will be installed throughout the structure.

Standing as it will on an elevation, the floodlighting effects which are planned are expected to be particularly effective.

Each floor is designed for the efficient operation of inter-departmental business, the eleventh floor being reserved for the general executive offices. The president's office and directors' room will occupy the twelfth floor, opening on two balconies which will give a magnificent view of the city. Rest rooms, auditorium and clubrooms have been given careful thought, and every detail leading to the convenience of the public and the employees has been provided.

Excavation will start in the fall and the actual construction will be carried on during 1929 so that the building will be ready for occupancy early in 1930. The estimated cost of building and land is $2,500,000.

Report of Progress on Airway Construction

A report of progress in airway construction made by the Aeronautics Branch of the Department of Commerce states that on June 30, 1928, the lighted mileage of mail airways totaled 7,698, with 910 miles of additional airways equipped with intermediate fields and markers for day fiying. There remain 7,211 unlighted mail route-miles pending, under contract or actually operating. For the year ending June 30, 1929, the department plans lighting 4,000 of these. Radio weather reporting and communication stations total 17 on the transcontinental and two on the Salt Lake-Pasco route.

The status of construction on the various Western airways is given in the report as follows:

Salt Lake-Pasco: Construction work has been practically completed on the Boise-Pasco section of this airway, the remaining work being largely minor items such as painting.

Los Angeles-San Francisco: Construction has been virtually completed, with the exception of minor items. Leases are being obtained for three additional sites between Newhall Tunnel and Vail Field, Los Angeles.

San Francisco-Redding and San Francisco-Blue Canyon Sections: Work has been started on these airways.

Verdi-Battle Mountain Section of San Francisco-Salt Lake Airway: Construction work was scheduled to be started about July 15. On the Battle Mountain-Salt Lake City section of this airway work was to have been begun July 6.

Apex-Salt Lake Section of the Los Angeles-Salt Lake City Airway: Work was expected to start July 15.

Arizona Holds Meeting on Colorado River Rights

As the result of a formal call issued by the Colorado River Commission of Arizona for a state-wide meeting of citizens "to discuss a program of action for the preservation of Arizona's rights in the Colorado River," a meeting was held in Prescott July 14.

Two of the three active members of the body expressed the opinion that litigation was necessary to settle differences between Arizona and California, according to press dispatches.

A. H. Favour, state senator from Yavapai County and one of the commissioners, pictured the difficulties between the two states as a question of whether the federal government had the right to enter one state and invest money in taxless improvements for the benefit of another state.

McGraw-Hill & A. W. Shaw Companies Merge

A consolidation affecting two large publishing interests has been brought about by the merger of the McGraw-Hill Publishing Company, Inc., of New York, and the A. W. Shaw Company of Chicago.

The Shaw organization publishes The Magazine of Business, System, and Industrial Distributor and Salesman, while the McGraw-Hill organization is the publisher, either directly or through subsidiary and affiliated companies, of over twenty leading business papers, including Electrical West, and of engineering and business books. The two companies have had a close relationship since last fall when they jointly formed the McGraw-Shaw Company, which publishes Factory and Industrial Management and Industrial Engineering.

A. W. Shaw will continue as chairman of the board and James H. McGraw will become president of the A. W. Shaw Company. Mr. Shaw will also become a director of the McGraw-Hill Publishing Company, Inc., and will continue as president of the McGraw-Shaw Company. Wheeler Sammons will become a director and member of the executive committee of the McGraw-Hill Publishing Company and senior vice-president and general manager of the A. W. Shaw division of the business, which will be known as the "A. W. Shaw Company, a division of the McGraw-Hill Publishing Company, Inc." The McGraw-Shaw Company will also be operated as a division of the McGraw-Hill Publishing Company.

Two reasons for the merger are stressed by the officers of the merging companies. The magazines of the two organizations are complementary in character. The Shaw papers cover business broadly, giving the business man an understanding of what is going on in all branches of trade, industry and finance. Their service is extensive in character. The McGraw-Hill service, on the other hand, is intensive. Its magazines give a highly specialized service to given major industries and to related industrial groups. Thus the consolidated companies serve the business man in both his general and special business interests. The second reason is the very evident economy and increased effectiveness of consolidated operation.

Announcement also has been made by the McGraw-Hill company that it will publish, starting with the October issue, a new monthly to be known as Food Industries. The publication will be for those interested in the manufacturing and processing of foods. Editorial direction of Food Industries will be under Dr. H. C. Parmelee, editor of Chemical and Metallurgical Engineering and vice-chairman of the editorial board of the McGraw-Hill publications, who will continue in those executive positions. M. A. Williamson, business manager of Chemical and Metallurgical Engineering, also will be business manager of the new monthly.

There's Music in the Air in Southern Colorado

ITS saxophone band and its ukulele club are two of the proudest things the Southern Colorado Power Company, Pueblo, is of.

The organization of the band took place in August, 1927. Its first appearance was in November at a Southern Colorado Power Company Club dinner dance. After many other public appearances, including programs for luncheons, danners and parades, the band gave a concert at the City Auditorium. At this program the members of the band wore for the first time their new tuxedos. Those who had heard the band's first feeble attempts at making music, and later their distressingly vigorous attempts, could hardly believe their harmonious rendition of difficult and intricate numbers was the result of but a few months' practice. When on parade the members of the band are costumed in white with black sashes and black fezes adorned with gold tassels and lettering.

The ukulele club was organized in January, 1928. Its membership was limited to girl employees, and its purpose was to be entirely social. In their first appearance at a company dance the girls demonstrated such exceptional entertaining ability that it was necessary to enlarge their sphere of activities, and as a result they have been featured on many programs, including

programs before every luncheon club in the city. In addition to playing the "uke" and singing songs of popular appeal the girls also exhibit a little "stepping" of a delightfully pleasing type.

Rail Electrification Is Progressing in North

Work of constructing the new Great Northern Railway track substation at Cashmere, Wash., one of the three new substations being installed between Wenatchee and Cascade Tunnel in the electrification of the railway, is progressing rapidly. Similar stations will be built at New Leavenworth and Winton, in addition to those at Wenatchee, Cascade Tunnel, Scenic and Skykomish, which are now in operation.

Energy for the Cascade electrification is supplied by the Puget Sound Power & Light Company at 110 kv., 3 phase, 60 cycles, to the railroad substations at Skykomish, Wenatchee and Tumwater, and at those stations transformers and frequency converters supply power to the main railroad transmission line at 44 kv., single phase, 25 cycles. The track transformer substations are fed from the 44-kv. railroad transmission system and in turn feed the trolley at 11.5 kv.

In connection with the installation of transmission lines and track substations, a 13.2-kv., single-phase, 25-cycle primary signal circuit is being installed, together with new electric lighted block signals.

It is expected that the transmission lines and substations will be completed by Sept. 15.

Washington Water Power Company Buys Small Utility—Another small distribution system was purchased recently by The Washington Water Power Company with the acquisition of the Steptoe Light & Power Company at Steptoe, Wash., which includes fifteen miles of 6.9-kv. line.

Nine Lives Snuffed Out by Disastrous Accident in Substation

STEALTHILY rose the smoke from the motor-generator set, portending evil. Just in time the dread sign of disaster was discovered. Quickly the machine was shut down. Quickly willing hands made an examination, revealing badly burned coils which would have to be replaced before the generator again could operate, but no sign of the cause of the trouble. Not until that night was it discovered that nine lives had been ruthlessly snuffed out in one short instant. Quite unexpectedly they came upon the pitiful scene that told only too well the tragic story of how swiftly death had struck. Silently, sadly, they gazed upon the touching remains of what once had been nine pulsating lives.

So might one of our leading newspapers have written the story of the tired feline that sought repose on the rotor of one of the motor-generator sets in the British Columbia Electric Railway Company's Victoria substation. Tabby's lack of judgment resulted not only in the loss of all her nine lives but curtailed street car service for a week.

(This happened some time ago. It is published now in the hope that those of our readers who know of similar queer accidents will tell us about them and send in photographs, if available. Payment of $1 will be made for each item published, with an additional $1 for each photograph used. Explanatory matter should be concise. Address manuscripts and photographs to News Editor, Electrical West, 883 Mission St., San Francisco.)

Personnel of Commission to Investigate Boulder Dam Site Announced

Washington Correspondence

A REPORT on Boulder Dam in which the public is certain to have confidence seems assured by the appointment by the Secretary of the Interior of a commission composed of the following: Major General William L. Sibert, U.S. Army, retired; D. W. Mead, professor of hydraulic engineering, University of Wisconsin; Robert Ridgeway, former president of the American Society of Civil Engineers; Charles P. Berkey, professor of geology, Columbia University; and W. J. Mead, a geologist on the staff of the University of Wisconsin.

This commission, under a joint resolution adopted at the last session of Congress, is to examine the proposed site of the dam, review the plans and estimates made therefor, and to report on "matters affecting the safety, the economic and engineering feasibility, and the adequacy of the proposed structure and incidental works."

In announcing the appointments Secretary Work stated that the selections had been made because of the eminence of each man in his profession, and for the reason that he has not been connected with the area to be studied either through personal interest, residence or previous intimate knowledge of the project. The department gave out the following biographical sketch of each appointee:

General Sibert is a retired army engineer of long and distinguished service. As a young man he had a long career in river and harbor work. He built the great Gatun locks and dam at Panama and the breakwater at Colon Harbor. He was Red Cross chief engineer for the study of flood prevention in China. He commanded a division in France during the World War and returned to America to organize the Chemical Warfare Service. He retired from active service in 1920 and lives at Bolling Green, Ky.

Robert Ridgeway has been chief engineer for the New York subways and is a past president of the American Society of Civil Engineers. He had to do with the building of the New York aqueduct and storage dam, was in charge of the construction of the South Ferry loop and the tunnels under the East River and the Brooklyn subways. He was engineer for the Catskill aqueduct. He has been engineer for the Transit Commission and chief engineer of the Board of Transportation for the City of New York and adviser in such matters to the City of Chicago.

Daniel Webster Mead, veteran engineer, is a native of New York and a graduate of Cornell. He is 66 years old. As a young man he worked for the United States Geological Survey, became city engineer of Rockford, Ill., professor of hydraulic engineering at the University of Illinois, built waterworks for various municipalities, wrote treatises on hydraulogy and water power engineering, and became professor of hydraulic engineering at the University of Wisconsin.

Warren Judson Mead is a geologist at the University of Wisconsin. Though but 48 years of age he has been a member of the faculty of the University of Wisconsin since 1906. He has long had a consulting practice in economic and engineering geology.

Charles P. Berkey has been professor of geology at Columbia University since 1903. He was geologist for the New York State Board of Water Supply on the Catskill aqueduct and geologist of the Third Asiatic Expedition of the American Museum of National History. He has had many years of service as consultant in the application of geology to engineering undertakings.

First Unit of Long Beach No. 3 Plant Dedicated

With appropriate dedicatory ceremonies the first unit of the Southern California Edison Company's Long Beach steam plant No. 3 was put in operation June 26. Russell H. Ballard, president of the company, presided. S. L. Shuffleton, vice-president of Stone & Webster, Inc., who are building the plant, started the 99,999-kva. generator.

This unit, which is equipped with a 125,000-hp., single-shaft turbine and three cross-drum boilers, will have a capacity of 90,000 kw. It is the first of eight units of equal size which are to be installed in the plant, giving it an ultimate capacity of 720,000 kw. It is estimated that the work will cover a period of ten years.

The ceremonies were attended by representatives of the Southern California Edison Company, Chambers of Commerce of Los Angeles and Long Beach, the Los Angeles Board of Water and Power Commissioners, the Los Angeles Bureau of Power and Light, and the City Councils of Long Beach and Los Angeles.

Second Unit Is Added to Seal Beach Plant

On July 1 the new 48,575-hp. turbine being installed in the Seal Beach steam plant of the Los Angeles Gas and Electric Corporation was "rolling" and was expected to be in regular service by Aug. 1. With the addition of this unit the maximum capacity of the plant will be 80,000 kw. Generating equipment consists of one 46,000-hp. turbine, one 43,750-kva. generator, and three cross-drum, 2,556-hp. boilers.

No additions to the building were required for this second unit.

Occupies Attractive New Office and Appliance Store

The Vallejo Electric Light & Power Company, Vallejo, Calif., is occupying attractive quarters in its new office building and appliance store at 415 Virginia St. The building was formally opened to the public not long ago at an evening reception, and for two hours, from 7 o'clock until 9:30, the place was filled with guests of the power company who had called to inspect the premises.

A view of the appliance store is shown at the left of the illustration. In the center is the model kitchen, and the picture on the right gives a general view of the main floor.

One of the features of the new establishment is the fixture room, with its exhibits of various types of lighting fixtures and facilities for displaying them to the best advantage.

Albert Casper is general manager of the company.

Named Assistant to Chief of Power Bureau

Carl A. Heinze, for the past twelve years distribution engineer for the municipal Bureau of Power and Light, has been appointed assistant chief electrical engineer and general manager of the Bureau. This appointment became effective July 1, and was made by the Board of Water and Power Commissioners on the recommendation of E. F. Scattergood, chief electrical engineer and general manager of the Bureau.

Mr. Heinze first attracted city-wide attention when, under the direction of Mr. Scattergood, he assumed the task of taking over, rebuilding and coordinating with the original city system the Los Angeles distributing system, purchased from the Southern California Edison Company in 1922. He began his service with the Los Angeles water and power projects during the early days of the aqueduct construction work, and has been actively engaged continuously since that time except for the period of the World War.

The Power Bureau's new assistant chief and general manager recently was elected president of the Los Angeles Electric Club for the ensuing year.

Sierra Pacific Power Co. New Name of Utility

Sierra Pacific Power Company is the name now being used by the former Truckee River Power Company, Reno, Nev. There is no change in the corporate existence of the company, according to George A. Campbell, manager, and there was no special reason for making the change in name other than that it was thought better to have the operating company known by a name which would tie in more satisfactorily with the name of the holding company, which is the Sierra Pacific Electric Company. The Sierra Pacific Power Company is under the management of Stone & Webster, Inc.

The Sierra Pacific Power Company recently was granted a certificate of public convenience and necessity by the California Railroad Commission to supply current at wholesale to the recently formed Truckee Public Utility District. The district distributes the electricity.

Brady Medal Presentations Due Before Oct. 1, 1928

All electric street railways, no matter how small, are eligible to compete for the Anthony N. Brady Memorial Medals to be awarded for the best accomplishment in accident prevention and health promotion work for the year ending Dec. 31, 1927, according to announcement of Arthur Williams, vice-president in charge of commercial relations, New York Edison Company, and president of the American Museum of Safety. All presentations by the companies competing for the awards must be submitted to the American Museum of Safety on or before Oct. 1, 1928.

The Brady medals, which were authorized in 1914 by the family of Anthory N. Brady, for the purpose of encouraging and giving recognition to organized accident prevention and health promotion activities by street railway companies, consist of three medals, gold, silver and bronze. All are first prizes awarded in three groups of companies classified as follows: those operating more than 5,000,000 vehicle miles per year; those operating more than 1,000,000 and less than 5,000,000; and those operating less than 1,000,000. The silver medal of 1926 was won by the El Paso Electric Company.

The committee of award is composed of Louis Gawtry, chairman, president of Bank for Savings, New York; Col. A. B. Barber, manager, transportation and communication department, U.S. Chamber of Commerce, Washington, D. C.; James H. McGraw, president, McGraw-Hill Publishing Company, Inc., New York; and Lucius S. Storrs, managing director, American Electric Railway Association, New York.

News Briefs

Civil Service Examination — The United States Civil Service Commission announces open competitive examinations for associate and assistant electrical engineers. Applications must be on file with the Civil Service Commission at Washington, D. C., not later than Aug. 15. The examinations are to fill vacancies in the office of the Supervising Architect, Treasury Department, for duty in Washington, D. C., or in the field. The entrance salaries are $2,600 a year for the assistant grade, and $3,200 a year for the associate grade. Higher-salaried positions are filled through promotion. Full information may be obtained from the United States Civil Service Commission at Washington, D. C., or from the secretary of the United States Civil Service Board of Examiners at the post office or custom house in any city.

Washington Utility to Construct Power Line—The Grays Harbor Railway & Light Company, Aberdeen, Wash., plans immediate construction of a 22-mile power line in the Grass Creek district to supply power to the $3,000,000 chipping plant of the Grays Harbor Pulp Company. The power line will cost approximately $102,000 and will serve pumping stations on both the Hoquiam and the Wishkah Rivers. Lines will carry 26,000 volts.

New Electrical West Index Ready for Distribution—An index to Vol. 60 of Electrical West, which includes the issues from January to June, 1928, inclusive, has been prepared and is now ready for distribution. Copies may be obtained upon request of McGraw-Hill Company of California, 883 Mission St., San Francisco.

West Kootenay Company to Develop Plant on Pend Oreille River—Permission to develop 80,000 hp. on the Pend Oreille River is asked by the West Kootenay Power & Light Company of the provincial government of British Columbia. The river is legally known as the Clark's Fork of the Columbia. The Z Canyon project is on the same river a few miles from the West Kootenay's site, though the developments are not in conflict. Power from the development would be used by the Consolidated Mining & Smelting Company at Trail, B.C., where one of the largest silver-zinc-lead smelters in the world is located. The mining company controls the West Kottenay company.

Two Washington Companies Building 110-kv. Line—Construction will begin at once on a new 110-kv. transmission line from the Chelan power station of The Washington Water Power Company, following the Columbia River south to Wenatchee, Wash., where it will connect with the present transmission line of the Puget Sound Power & Light Company. Each company is building a portion of the line, which will be about 40 miles long. The survey work necessary has been completed. The Washington Water Power Company expects to have the second unit of 32,200-hp. capacity ready at the Chelan station early in August.

Tacoma, Wash., to Supply Power at Low Rate to Two Electro-Chemical Companies—Setting the minimum cost rate of 1½ mills, just half that offered to ordinary industrial loads, two ordinances have been passed by the City Council of Tacoma, Wash., authorizing the department of public utilities to complete power contracts with the Hooker Electro-Chemical Company and the Tacoma Electro-Chemical Company. The two companies are expected to buy at least $500,000 worth of power yearly from the city. The Hooker company will contract for a maximum demand of 8,500 kw.

To Construct Substation—The City Light Department, Seattle, Wash., will proceed at once with construction of its Spring St. substation, at a cost of between $350,000 and $400,000 for the building and site. The structure will be two stories in height with two basements. A total appropriation of $991,500 to cover substation and equipment has been asked.

Correction—In the July 1 issue of Electrical West, p. 17, the statement was made that the lighting of the grounds of the Huntington Hotel, Pasadena, during the P.C.E.A. convention was directed by Frank van Gilluwe of C. W. Cole & Company, Los Angeles. Mr. van Gilluwe has been an employee of the Pacific States Electric Company, Los Angeles, for some time.

Northwest Electric Light & Power Association

Winning Speech in Public Speaking Contest

The following speech by Mrs. Mabel Maxwell, of the Portland Electric Power Company, won first prize in the Class II contest on the subject, "Government in Business," conducted by the public information committee of the Public Relations Section at the Northwest association's annual convention:

Why should the government experiment in business when it has not yet proved that it can successfully solve the economic problems that properly belong to it, such as tariff, taxes, and merchant marine?

Take as an example of government operation the Emergency Fleet Corporation deficit; as another, the railroads. The government left the railway service with a loss of nearly two billion dollars after operating it two years. With the exception of Great Britain, every country in the world has tried government ownership of railroads; but only two—Prussia and South African Dominion—have succeeded in earning a full amount of interest on the capital invested.

Our own industry is affected directly when proponents of government-in-business advocate the government's developing water power. The very first need, in taking over the water power business, would be for expert engineers. These engineers the government could not get. Why? Because it would not pay the market price for the services of such men. Even assuming that it did pay the price, the engineers would be too hampered by red tape to accomplish results satisfactory to them, and, knowing this, they would not risk their reputations, except in time of war. The success of any water power development depends upon the wisdom and vision of men whose knowledge has been gained through years of experience. This experience cannot be obtained under changing conditions of government. The whole world looks to the United States for scientists and engineers when expert advice on hydro-electric matters is desired. These scientists and engineers have risen from the ranks of the great privately owned public utilities.

Under our constitution, which has stood the test of 150 years, one of the duties for which our government was designed is to protect the rights of the people. Therefore, the government properly regulates private enterprise as one of its functions.

Business unhampered by government has made us great as a commercial nation. To be sure we have been called "a dollar nation"; but no nation has ever become great in the things we value above the dollar—education, science, art, literature, music—until it has first reached the heights of commercial prosperity. Through the development of our natural resources we have achieved the highest level of average comfort and luxury which the world has ever known.

Once the government entered business, it would extend into all fields of business until private initiative would be driven out. There is an element of selfishness in business that we all need. It is, therefore, not only an issue affecting our industry, but is also a question to be answered by all thinking citizens, as it strikes right at the very base of American principles. We *must* keep government out of business if we are to maintain our individual independence and freedom upon which this nation is founded.

Pacific Coast Electrical Association

Winning Essay of Customer Relations Committee Printed in Full

First prize in the essay contest conducted by the customer relations committee of the Commercial Section was won by DeWitt C. Scott, San Joaquin Light & Power Corporation, Fresno, and read at the Pasadena convention. In accordance with the statement made in the July 1 issue of Electrical West, this essay is published in full:

If one will carefully underline all the specific instructions in the booklet, "Employee and Consumer," he will find that out of the 162 given in its text, 53 have a direct bearing upon *service*, 44 deal with *understanding* on the part of the employee or the consumer, and 28 tend to develop *tact* in the employee. Courtesy receives mention 21 times and personal appearance is stressed sixteen times.

Service

Service is of primary importance because it is the stock in trade of our company and by it the public is quick to judge. If each one of us flavors our daily efforts with the true "spirit of service" we will be laying the foundation upon which the whole structure of good-will is erected.

Physical service has reached a high standard in the industry. Scientific improvements have increased the dependability of the service and have reduced costs; the saving has been shared with the public through reductions in rates. The physical properties of the company stand as silent, faithful monuments to the efforts of the engineers and management—serving the public at its bidding 24 hours a day.

But the human service of our organization has not kept pace; and, unfortunately, the public is prone to judge more by the human rendition of service than the perfections of electrical service. "Man failures" will not be overlooked by the consumer.

Several years ago, on a cold and rainy morning, I was awakened at 4 o'clock in the morning by the harsh ring of the phone bell. It was the local newspaper man and from the tone of his voice I knew he was in trouble. None of his motors would start and the paper had to go to press; he had lights but the motors only "hummed." Sensing the trouble I lost no time in getting to the power bank which supplied that section of the town and found that the storm had caused one of the primary fuses to blow. It was quickly replaced and when I arrived at the newspaper plant the press was running.

When I read the paper that morning I was surprised to discover on the front page an article headed "Prompt Service of Power Company Made Possible the Printing of This Issue." They had been receiving perfect electrical service for years, but it took the promptness and willingness of personal attention to bring forth their greatest appreciation of the company's service.

Service promotes but does not insure good-will. The reactions which greeted interconnection prove that public appreciation does not always automatically follow improvements in service—unless they are understood.

Understanding

Where you meet with antagonism against the company you will usually find the underlying cause is the lack of understanding. Sheer growth and the peculiarities of our business have taxed the comprehension of the average consumer; to him the true motives of the company are hid behind a smoke screen of routine and printed rules.

There is a logical, rational reason behind every rule and policy of the company. Knowledge on the part of the employee as

to the "why" of procedures will result in more intelligent performance and as he imparts this information to the customer forbearance will result—from mutual understanding.

Ignorance sometimes leads to disastrous results. I was attracted to the scene of a fire recently where a rural dwelling was burning. Going to the meter box, which was on the garage and safe from the flames, I backed out one of the fuses. A penny dropped out. Removing the other fuse I found it also had a penny behind it. The owner of this home had perhaps looked upon the company installation rules as merely a matter of routine. He did not realize that the "why" behind the rule covering fuses was his protection.

Every day we come in contact with people who have distorted ideas about our business. They do not know that most of their monthly bill represents cost of "delivery" and not "manufacture."

That if water power were "free goods" it would take a huge investment to harness and distribute the energy.

That the utility has a "limited" and not a "guaranteed" return on its investment.

That commission regulation combines the benefits of private initiative with the checks of governmental control—an ideal arrangement.

The lack of information may permit the smoldering embers of misunderstanding to be fanned into flames of enmity, with disastrous results not only to the company but also to the public.

Tact

All our efforts to serve well and to acquaint the customer with our business will be of no avail unless, in so doing, we employ that all important factor—tact. It is merely doing the proper thing at the right time.

I remember an incident which occurred on the farm of a prospective consumer. A fellow employee and myself had got into our car and as we were closing the conversation we filled our pipes. His tobacco can being empty he carelessly tossed it out of the car. The owner coldly asked him to take it off his property. We learned afterward that he was opposed to smoking; and the lesson we learned that day will always make us more considerate of the customer's thoughts and property.

The employee contacts of the company are its most intimate and timely method of creating good-will. The effects of many dollars spent in institutional advertising can be destroyed by the acts and words of tactless employees.

Building good-will is an art and not an exact science; but we might say that the "equation" of public relations is: *Good Public Relations* equal *Service* plus *Understanding* plus *Tact*. It is made up of indeterminate quantities and does not lend itself to solution. But we do know that as we add to the factors on the right side of this equation the left also increases. If we allow these items to become minus quantities, public relations become negative—good-will turns to ill-will.

As electric science has advanced the problems and business of the industry have grown greatly. This progress has been so rapid, one development crowding so fast upon another, it would be difficult without adequate information for general public understanding to keep abreast of the advance.

Recognizing that lack of knowledge is as unfair to the public as it is harmful to the industry, the electric utilities consider it their responsibility to place all the facts before the public.

It is for these reasons that the National Electric Light Association, among its other important functions in the development of the electrical industry, some years ago assumed the responsibility and adopted the policy of preparing and diffusing as widely as possible full, accurate and timely information on all phases of the business.

In this effort the association has encouraged the use of all proper channels for the diffusion of information concerning the industry and has made the facts available to newspapers, magazines, educational institutions and to teachers in public schools.

The truth of the statement, not the place where it is put, is the test. Full responsibility, openly avowed, for every word and act, is desirable. All members of the association should scrutinize everything they say and do in the light of these principles; and to the extent which public investigation or public criticism of what we have done may aid in disclosing improprieties, to welcome it. We do not wish to be judged either by intemperate criticism or by our own declarations. We are ready to be judged by our accomplishments and our acts.

The National Electric Light Association in the interest of the public and its own will continue to make available to the public the facts on the progress and development of the industry and to review from time to time the information distributed in order that every assertion of fact, policy or principle, shall conform to the highest standards of accuracy.

Declaration of Policy of National Committee

Due to lack of space the declaration of policy included in the report of the N.E.L.A. public policy committee and read by R. H. Ballard, chairman, at the P.C.E.A. convention, was omitted from the July 1 issue of Electrical West. This declaration, also read and endorsed at the annual convention of the Northwest Electric Light and Power Association, follows in full:

The National Electric Light Association has long believed that the success of the electrical industry in the performance of its public functions has been and must be based upon public confidence in its integrity, in its motives and in the character of its achievements. The association has believed further that that confidence could be based only upon knowledge, and maintained only by a willingness on the part of the industry that the public should have the fullest details of the manner in which it operates.

In the space of less than half a century this nation has reached a state of advancement where the electrical industry furnishes and the nation usefully employs nearly as much electrical energy as the rest of the world combined.

A. I. E. E.

Power Bureau Engineers Win First Honors

W. S. Peterson and H. J. McCracken, members of the engineering staff of the Los Angeles Bureau of Power and Light, were awarded first honors by the American Institute of Electrical Engineers for the year's best written contribution on electrical utility problems.

The prize was awarded them on the basis of a joint paper dealing with a study of the intricate phase of overhead electrical distribution work. The paper had been prepared by Peterson and McCracken, and presented at a meeting of the Los Angeles section of the Institute on Dec. 6, 1927.

The award carries with it a prize of $100 which was presented to the two Power Bureau engineers at the recent summer convention of the Institute in Denver.

Five American Engineers Made Honorary Members

Five distinguished American engineers were elected honorary members of the American Institute of Electrical Engineers at a meeting of its board of directors held during the annual summer convention of the institute in Denver.

These men were Thomas A. Edison, John J. Carty, Michael I. Pupin, Ambrose Swasey and Elihu Thomson.

New Officers Elected by Institute for Year

R. F. Schuchardt, electrical engineer, Commonwealth Edison Company, Chicago, was elected president of the American Institute of Electrical Engineers for the year beginning Aug. 1, 1928, as announced at the annual meeting held in Denver during the annual summer convention.

Other officers elected were: vice-presidents—E. B. Merriam, Schenectady, N. Y.; H. A. Kidder, New York City; W. T. Ryan, Minneapolis; B. D. Hull, Dallas; G. E. Quinan, Seattle. The directors are A. E. Bettis, Kansas City, Mo.; J. Allen Johnson, Niagara Falls, N. Y.; A. M. MacCutcheon, Cleveland. George A. Hamilton, Elizabeth, N. J., was re-elected national treasurer.

Excellent Program and Interesting Trips Planned for A.I.E.E. Convention

Plans are well under way for the Pacific Coast convention of the American Institute of Electrical Engineers, to be held in Spokane Aug. 28-31. Much thought has been given to the program, which is given below:

Tuesday, Aug. 28

Morning Session

9 a.m. Registration at Convention Headquarters, Davenport Hotel.

10 a.m. Student Technical Session.

Afternoon Session

2 p.m. Calibration of the Points Gap for Measurement of the Crest Values of 60-Cycle Voltages, by Professor Carroll, Stanford University, Calif.
Research on Neon Gas Tubes, by Prof. F. O. McMillan, Oregon Agricultural College.
Automatic Substation, by S. J. Lisberger, engineer, Pacific Gas and Electric Company, San Francisco.
Calculation Single-Phase and Three-Phase Short Circuit Currents on Systems Under Load, by R. H. Park and E. H. Bancker, General Electric Company, Schenectady.

Evening Session

8 p.m. President's reception and informal dance.

Wednesday, Aug. 29

Morning Session

9 a.m. The Electrolytic Zinc Plant of the Sullivan Mining Company, by E. R. Fosdick, assistant engineer, The Washington Water Power Company, Spokane, Wash.
The Great Northern Railway Electrification, by R. D. Booth and E. L. Moreland, engineers, Jackson-Moreland Consulting Engineers, Boston.
Power Supply for Automatic Block Signals and Automatic Train Control, by C. F. King, general engineer, Westinghouse Electric & Manufacturing Company.

Afternoon Session

2 p.m. Golf Tournament at the Spokane Country Club.

Evening Session

8 p.m. Address, Litchtenburg Figures, by Dean C. E. Magnusson, University of Washington.

Thursday, Aug. 30

Morning Session

9 a.m. Student Technical Session.

Afternoon Session

2 p.m. Movement of Overhead Line Conductors During Short Circuits, by W. S. Peterson and H. J. McCracken, Jr., Los Angeles Bureau of Power and Light, Los Angeles.
Economy in the Choice of Line Voltage and Conductor Sizes for Transmission Lines, by E. A. Loew, professor of electrical engineering, University of Washington, Seattle.
Generalization of Transmission Line Diagrams, by Prof. H. V. Carpenter, dean of engineering, Washington State College, Pullman.
Residual Voltages and Currents in Power Systems, by L. J. Corbett, assistant engineer, Pacific Gas and Electric Company, San Francisco.

Evening Session

6:30 p.m. Banquet and entertainment by J. S. Thompson, president, Pacific Electric Manufacturing Corporation, San Francisco.

Friday, Aug. 31

Morning Session

9 a.m. Vacuum Tube Applications in the Light and Power Industry, by Dr. L. F. Fuller and Mr. Tolsen of the General Electric Company.
220-kv. Carrier-Current Installation on the Pacific Gas and Electric Company System, by C. F. Boeck and R. D. Gibson, Bell Laboratories, New York.
Carrier Telephone System for Short Toll Circuits, by H. S. Black, Bell Laboratories, New York, and M. L. Almquist and L. M. Ilgenfritz, American Telephone & Telegraph Company, New York.

Afternoon Session

2 p.m. New Light on Lightning Problems from Klydonograph Studies, by A. L. Atherton, Westinghouse Electric & Manufacturing Company, East Pittsburgh.
Fundamentals of Lightning Phenomena in Thunder Storms, by Mr. Lissman, fellow in electrical engineering at Stanford University, Calif.
Heat Flow from Underground Electric Power Cables, by N. P. Bailey, University of Idaho, Moscow.
Cable Corrosion in Creosoted Wood Duct, by R. M. Burns, Bell Laboratories, New York, and B. A. Freed, Pacific Telephone & Telegraph Company, Seattle.

Evening Session

8 p.m. Film showing transatlantic telephone service.

Saturday, Sept. 1

Inspection trips.

The ladies are invited to all sessions of the convention. The following entertaining program, however, has been arranged particularly for them.

LADIES' PROGRAM

Tuesday, Aug. 28

Evening

8 p.m. President's reception and informal dance.

Wednesday, Aug. 29

Afternoon

Ladies' drive to the country club for tea, followed by cards.

Evening

8 p.m. Theater party.

Thursday, Aug. 30

Afternoon

Ladies' sightseeing trip about the city, followed by tea and music at Manito Golf Club.

Evening

6:30 p.m. Banquet and entertainment by J. S. Thompson, president, Pacific Electric Manufacturing Corporation, San Francisco.

Friday, Aug. 31

Noon

Ladies' auto-bus trip to Coeur d'Alene City, Wolf Lodge Bay, and Hayden Lake. A basket lunch will be served.

Evening

Film showing transatlantic telephone service.

Hotel Reservations

The Davenport Hotel has been chosen for convention headquarters, and all meetings are to be held there. It is thought best to have each member arrange his own reservations direct with the hotel. The rates for accommodations, European plan, at the Davenport Hotel are as follows:

Single rooms without bath, $2.25-$2.50 per day.
Double rooms without bath, $3.50-$4.00 per day.
Single rooms with bath, $3.00 to $6.00 per day.
Double rooms with bath, $4.50 to $10.00 per day.

Accommodations may be obtained at the following hotels which are within easy walking distance of the Davenport Hotel: Spokane Hotel, Coeur d'Alene Hotel, Dessert Hotel. Rates in these hotels are as follows:

Single room without bath, $1.50 and up.
Single room with bath, $2.00 and up.
Double room without bath, $2.50 and up.
Double room with bath, $3.50 and up.

A trip to the Coeur d'Alene district to inspect the new electrolytic zinc smelter and the Coeur d'Alene mines will be one of the features of the program. The Sullivan Mining Company recently started operation of the first unit of its electrolytic plant. This process is unique in a number of aspects, and the inspection of this plant will interest all engineers. There will also be an opportunity, for those who wish, to inspect some of the larger mines in the Coeur d'Alene country. This trip is also very attractive from a scenic standpoint.

Books & Bulletins

UNDERGROUND SYSTEMS FOR ELECTRIC LIGHT AND POWER

By T. C. Ruhling, vice-chairman, N.E.L.A. 1927 underground systems committee, member A.I.E.E. First edition; 6 x 9 in.; cloth bound; 346 pages; 221 illustrations; 30 tables. Published 1927 by McGraw-Hill Book Company, New York. Price $4.

This book covers in a comprehensive manner the construction details involved in the installation of underground duct and cable systems for electric light and power. The author, as a result of his wide experience in actual underground construction, presents a wealth of material and data which should be very helpful to the estimator and construction engineer or foreman, and it is among these that the book probably will find its widest use. It is not at all intended to be a technical treatise on engineering design, but rather a resume of modern practical methods of construction.

The first four chapters introduce considerable detail as to methods of excavating for and installing duct lines and manholes, outlining difficulties which may be met in actual practice and offering means for overcoming these difficulties. Attention also is given to safety measures necessary to guard against hazards peculiar to such construction. Information of material value to the estimator is given in chapters 5 and 6 in the form of cost data on 30 actual underground jobs, together with tables of theoretical values of excavation and concrete required under a large number of given conditions.

There are, in addition, chapters on street-lighting installations, cable laying and splicing, submarine cables, cable identification and records, each of which treats the subject in an entirely practical manner and offers many thoughts and suggestions which are only learned as a result of experience. For the engineer there has been added a chapter on cable characteristics with tables and formulas. A description is given of an effort now being made by one utility company to utilize short lengths of cable formerly wasted.

—H.H.B.

ELECTRIC CONTROL GEAR AND INDUSTRIAL ELECTRIFICATION

By William Wilson. 361 pages; 216 figures. Published by the Oxford University Press.

The electrification of industrial plants has been responsible for the development of control apparatus to the extent that the application of such equipment has become a distinct branch of electrical engineering. In this book the author has treated the subject in a comprehensive manner, going into sufficient detail to describe the development and application of control equipment. The book should be of value to practicing engineers as well as students.

The subject of control apparatus is introduced by two chapters on direct current and alternating current motors emphasizing the fundamental principles which have a bearing upon control apparatus design. Then manual starters and controllers, resistance control, and multiple voltage and series parallel control are covered each in a separate chapter. Solid resistors and liquid rheostats next are treated, followed by four chapters on the details of contactors, interlocks and switches, and electric braking. The next ten chapters are devoted to control of various classes of machinery from electric elevators and steel mills to electric cranes, machine tools and printing presses. The illustrations and diagrams are good, and an appendix of fourteen pages gives tables of the power requirements of various classes of machinery.

From the standpoint of the user of electrical apparatus, information is furnished giving the characteristics of various pieces of apparatus, and special attention has been given to the building up of control schemes and the reading of complicated control diagrams. The treatment of the subject covers British practice and machinery although the principles developed and methods described can well be applied to American practice and equipment. —E.R.S.

Meetings

Coming Events

American Institute of Electrical Engineers—Pacific Coast convention at Davenport Hotel, Spokane, Aug. 28-31, 1928.

Association of Electragists, International—Annual convention in Chicago, Aug. 6-10, 1928.

California Electragists—State convention at Hotel Fresno, Fresno, Calif., Oct. 18-20, 1928.

California Association of Electrical Inspectors—Annual convention in Sacramento, Calif., October, 1928, (date to be set).

Camp Co-operation VIII—Electrical Leagues' conference at Association Island, Henderson Harbor, N. Y., Aug. 2-7, 1928.

International Association of Electrical Inspectors—Annual meeting of Western Section in Denver, Colo., Sept. 10-12, 1928.

Illuminating Engineering Society—Annual convention at King Edward Hotel, Toronto, Ontario, Sept. 17-20, 1928.

Oregon Electragists—Annual convention at Multnomah Hotel, Portland, Aug. 18, 1928.

Rocky Mountain Division, N.E.L.A.—Colorado Utilities Association—Joint annual convention at Hotel Colorado, Glenwood Springs, Colo., Sept. 17-20, 1928.

Utility Employees' Summer Camp Formally Opened

Cozy Cove, the new summer camp of San Joaquin Light & Power Corporation employees, was formally opened with the annual San Joaquin Power Club picnic held recently at Bass Lake.

Five cottages and two dormitories have been completed this season, the construction being done entirely by volunteer employee workers. The dormitories each contain twenty beds, while accommodations for four persons are afforded by the cabins. Tent sites also are provided for campers. Drinking water is supplied from springs on the hill above the camp site. The grounds are wired for electric service, and both water and sewer systems have been completed. The project is being carried out in a three-year program, and additions will be made each year to increase the facilities of the camp.

The company has authorized the subdivision of the hillside adjoining Cozy Cove for use as cabin sites, and cottages are to be built immediately for L. J. Moore, executive engineer of the company; A. M. Frost, power sales manager; and Lee R. Duncan, president of the San Joaquin Power Club.

Annual Meeting of Boulder Dam Association

With nearly 100 members gathered from Los Angeles, San Diego, Riverside, Orange, San Bernardino, and Imperial Counties, as well as from Nevada and Arizona, the Boulder Dam Association held its annual meeting at the Breakers Hotel, Long Beach, Calif, July 21. S. C. Evans of Riverside, former director and now a member of the executive committee, presided and outlined a brief history of the organization formed at Fullerton, Calif., six years ago.

Representative Swing, co-author of the Swing-Johnson Boulder Dam Bill, spoke to the members and predicted the passage in Congress in December of the bill which he and Senator Johnson are sponsoring. Mr. Swing urged against too much overconfidence on the part of the proponents of the bill, stating that this one factor alone could bring about the defeat of the measure.

Chairman Evans took an optimistic view on the outlook for the Swing-Johnson Bill. Referring to the strong likelihood of the Swing-Johnson Bill being passed at the next session of Congress he said, "It looks now as if the association has almost outlived its usefulness.

All officers were re-elected for the ensuing year. They are John L. Bacon, San Diego, president; W. J. Carr, Pasadena, vice-president; Burdett Moody, Los Angeles, secretary-treasurer. W. J. Carr is a member of the California Railroad Commission, and Burdett Moody is business agent for the Bureau of Power and Light of the City of Los Angeles.

Who wouldn't wish to work for the San Joaquin Light & Power Corporation?

Here is a cottage under construction at Cozy Cove, the new summer camp of the San Joaquin Power Club, whose membership is made up of company employees.

And here is Bass Lake as it appears from Cozy Cove Camp. The picture was taken at the recent annual picnic when the camp was formally opened.

Arizona Utility Employees See Respiration Film

The picture, "Artificial Respiration," which was purchased by the Arizona Utilities Association, was shown at a recent meeting of the Employees' Association of the Central Arizona Light & Power Company at its plant in Phoenix, at which more than 180 of the 300 employees were present. The association's meetings are held on the third Tuesday of each month, and each employee is given $1 for attending. A card is signed by the employee to signify his presence at the meeting. The picture will be shown before the telephone company employees and before other utility organizations on its state tour shortly.

During the meeting matters of company interest were discussed bringing out better ways in which certain classes of work could be handled. A suggestion box, containing suggestions from employees during the past month on the betterment of company conditions, also was opened. A. F. Morairty, assistant general manager, reported on his trip to the N.E.L.A. convention at Atlantic City and emphasized the important place that had been given to accounting in the discussions at the convention. Other short talks were made by department heads, and music furnished by the Spanish Orchestra rounded out the evening's entertainment.

Utah Society of Engineers Elects Officers

At the annual outing and meeting of the Utah Society of Engineers, which was held not long ago at Saltair, J. A. Hale, chief engineer, Utah Power & Light Company, Salt Lake City, was elected president, succeeding L. D. Anderson. Other officers elected to serve with Mr. Hale are H. S. Kerr, chief engineer of the Utah State Road Commission, vice-president; H. C. Goodrich, chief engineer of the Utah Copper Company, second vice-president; Ralf R. Woolley of the U. S. Geological Survey, secretary; R. K. Brown, chief engineer of the Salt Lake & Utah Railroad, treasurer. R. A. Hart and Mr. Anderson will serve as members of the executive committee.

At the banquet which was held in the evening, Richard R. Lyman acted as master of ceremonies. Hamilton Park delivered an address on Boulder Dam, and President Anderson and President-Elect Hale told of the accomplishments and plans of the association.

Annual Golf Tournament of Washington Utility Employees—Thomas G. Aston, claim and tax agent, won the annual golf tournament for men employees of The Washington Water Power Company played over the Hayden Lake course near Spokane. He received the Miles W. Birkett trophy, put up for the first time this year by the general manager of the Spokane company.

Contractors, Dealers and Inspectors

Oregon Electragists Announce State Meeting in Portland

WHILE details of the program are not yet decided and therefore not ready to be announced the Oregon Electragists are now completing arrangements for their annual meeting, which will be held in Portland Aug. 18, at the Multnomah Hotel.

J. R. Tomlinson, secretary, in making the announcement sent out the following statement:

A live committee of Portland Electragists has been appointed to prepare a program of entertainment features following the business sessions, and their plans are already well matured. Judging from preliminary announcements it will be the most pretentious and worth-while event that the electrical contractors of Portland have ever staged. All events will be informal but they will be of the very best.

The ladies are especially invited to attend this convention. Special features are being planned for their pleasure and it is hoped that they will so enjoy themselves that they will desire to attend all future conventions of the association.

A detailed program is being prepared and will go to the printer in a few days. When copies are ready they will be forwarded to all concerned.

California Delegation Will Attend Convention

Besides Clyde Chamblin, president of the Association of Electragists. International, a number of California Electragists of prominence plan to attend the Chicago convention of the A.E.I., Aug. 6-10. One party is to leave San Francisco Aug. 3, and others are expected to reach the convention in time for the opening sessions.

The delegation leaving San Francisco will include President Chamblin and Mrs. Chamblin; H. H. Courtright, Valley Electrical Supply Company, Fresno; C. J. Geisbush, state manager, California Electragists; George Smith, president, and Earl Brown, manager, San Francisco Electrical Contractors and Dealers Association; and Frank Sievers, Coney & Kutchel, San Francisco, as representative of the local motor section.

L. H. Ellett, of the Electric Motor Service Company, Los Angeles, will attend as representative for the Southern Division motor section.

H. A. Porter, San Francisco contractor, who is motoring in the East, also will attend.

No announcement had been made as to any delegation from Los Angeles but it is understood one or two contractors from that locality plan to attend.

From Denver it is learned that E. C. Headrick, member of the executive committee of the A.E.I., plans to attend, accompanied by E. C. Shannon, president of the Denver assocation.

The Angelus Electric Company, specializing in industrial installations and motor repair, formerly at 713 East Third St., Los Angeles, has moved to a new building constructed for them at 1219 East Herbert St., corner of Mines.

Estimators Stage Fishing Trip in South

Under the auspices of the Estimators' Section, California Electragists, Southern Division, a group of 32 electrical men representing all branches of the industry indulged in deep sea fishing from the launch "W.K." out of Santa Monica recently.

In the party there reported ten members of the estimators, seven representatives of the Bureau of Power and Light, two from the Los Angeles Gas and Electric Corporation, six from the city inspection department, three consulting electrical engineers and four manufacturers' representatives.

The feeding arrangements, both for bait and lunch, were under Bob Statts. Winners of prizes given by the Bureau of Power and Light were:

Largest fish, an electric cooker, Mr. Crow; first fish, an electric toaster, Mr. Hines; most fish, an electric iron, Mr. Church; and a booby prize, a string of miniature imitation fish, Harry Hamm.

The Plot Thickens

"Kelly" Courtright, Earl Browne and Ed Martin took advantage of the boat ride to lay plans for the state convention of the California Electragists at Fresno in October.

Re-elected President of the Los Angeles Association

For another year the Electrical Contractors and Dealers Association of Los Angeles will be guided by J. G. English. An election recently returned "Jim" English to the chair for another term.

J. G. ENGLISH

Mr. English is owner of the English Electric Company, of Los Angeles. He first came to California from Colorado Springs in 1910. In 1918 he and Paul Ehm started the Golden State Electric Company, of Los Angeles, still owned by the latter.

Mr. English went into business for himself in 1922, calling his firm the English Electric Company, specializing in class A buildings. Some of the most recent notable jobs have been the Los Angeles City Hall, new Warner Bros. Theater, Pacific Southwest Bank Building, Angelus Temple and Asbury Apartments.

Mr. English is also a member of both the California Electragists and the A.E.I.

Salt Lake Contractors Give Dinner Dance—Without much notice or noise the Electrical Contractors Association of Salt Lake City gave its annual party in the form of a dinner dance at Hillcrest, recently. Jobbers and power company representatives were guests of the occasion. J. A. Kahn, president, Capital Electric Company, was toastmaster, and George Randall furnished amusement with an acrostic in which the names of all members of the association were used.

Inspectors International to Meet at Denver

The newly formed International Association of Electrical Inspectors, with which both Northwest and California associations are affiliated, is to hold its first convention at Denver, Colo., Sept. 10, 11, 12. L. A. Barley, chief engineer, Mountain States Inspection Bureau, is convention chairman, and Dave Reed secretary.

Wharfingers?

Not at all. These were the reception committee which greeted the Northern Division Electragists on their arrival at the Sacramento docks.

Co-operative Clearing House Formed—Following up the plan of closer co-operation between the central station men and the contractors in various sections, on May 29 a co-operative group was formed in San Jose. The group consists of Mr. Kuster, district manager, and Mr. Ross, sales manager, respectively, Pacific Gas and Electric Company, San Jose, and the following contractors: Mr. Harvey of Guilbert Bros.; U. A. Kamerer, of the Coast Electric Service; Ted Russell, of King-Russell Electric; and Sam Pierce of Fred Doerr Electric. The group elected Mr. Harvey as chairman and Mr. Kamerer as vice-chairman, Mr. Harvey to act as secretary to take care of notices, etc. Meetings will be held on the last Tuesday of each month, and at the call of the chairman.

Richard Hurt, formerly employed by the Stevens County Power & Light Company, Colville, Wash., has purchased the interests of **H. E. Shelton** in the firm of **Sperry & Shelton,** contractor-dealers of Colville.

Beverly Hills Electric Store has moved into a new location at 1439 Santa Monica Blvd., Beverly Hills. This store was formerly located at 1435, some few doors away, and has moved into larger quarters.

McCaulley & Johnston Electric Store, formerly at 5461 Hollywood Blvd., has moved to new quarters at 1617 North Western Ave., Los Angeles.

Bruce H. Denney, formerly manager of the radio department of **Canning & Baugh,** electrical contractors and dealers, has opened a store of his own at 16 Ramsey St., Banning, Calif.

The Southwest Electrical Corporation, electrical contractors and dealers, has moved from its old location at 121 Pacific Ave., Redondo Beach, Calif., to new quarters at 322 South Catalina St., of the same city.

O. S. Peterson, electrical appliance dealer, who formerly operated from 836 Pine and 607 Pine St., Long Beach, Calif., has moved back into his old location at 642 American Ave., where he has added a radio department.

Rollin Smith, author of the National Handbook for Wiremen, is now conducting a class for electricians Monday and Thursday nights at the National Electrical and Automotive School, Los Angeles. The course is being held for the purpose of familiarizing electricians with the code and its problems.

Times Have Changed

Once upon a time a contractor could get a listening ear by saying, "I don't belong to no association and that's why I can do so and so." But times have changed.

The man who "don't belong to no association" is looked upon as a poor dub today. Bankers have been known to ask, as something upon which to determine credit risk, "Do you belong to your association?"

That's because associations have changed, too. In the old days the association was frequently—to state it politely—"in restraint of trade." But price fixing and arbitrary allocation of jobs belong to the dark ages. The laws of economics kick them out every time they show up.

Associations which work for the upbuilding of the craft, the improvement of its members in business and in competition, are sound. It is a credit to belong to them. Membership is something to be prized. The banker feels that it is worth a higher rating for it means responsibility and permanence.

A member of that kind of association can be proud to mention it to his customer, his builder, his architect and his friends. He can take pride in it and by doing so give them confidence in his association and himself.

Moreover he should lose no opportunity to do so. An association well advertised by the work of its members will be an association respected by the community it serves.

Build Power Line—Work has been commenced by **Hume and Rumble, Ltd.,** New Westminster and Vancouver electrical contracting firm, on the construction of an electric power line to serve the residents of Bergstrom Road, south of the British Columbia Electric Railway Company tracks. According to officials of the company the line will be approximately 1½ miles long and will serve 28 settlers. Of the total cost the residents benefited will be required to pay approximately $600 and the remainder will be borne by the power company.

Soskin Electrical Appliances, formerly located at 245 South Western Ave., Los Angeles, has moved out to 5154 South Western Ave. in the same city

Albert A. Leithold, electrical contractor-dealer, has opened a new store at 239 North Michigan Ave., Glendora, Calif. Mr. Leithold is an electrical engineer and formerly operated an electrical business in Glendora known as **Glendora Electric Company,** which he sold out. He has now returned after a long absence to open the new shop.

A new electric shop under the name of **Harris & Ray** has been opened in its own newly constructed building at 1214 University Ave., San Diego, Calif.

Robert J. Hanchett, estimator for the Los Angeles Electric Works, which closed recently, is now affiliated with the **Hill Electric Company,** 2705 South San Pedro St., Los Angeles.

L. H. Ellett, also formerly with the Los Angeles Electric Works, has acquired an interest in the **Electric Motor Service Company** with **Eric H. Engblom.** This motor service concern is located at 2357 East Ninth St., Los Angeles.

C. B. Campbell Electric Company, 518 Seneca St., Seattle, was awarded the first contract in the proposed $1,000,000 illumination program for downtown streets. The award was made on Alternate "A," which provides for a pole comprising a bronze base and top, the pole proper being a bronze shell filled with concrete, supporting two and three lights. The next contract will be let some time in March for another unit of the work.

Gans Bros. Electric Company, for twenty years electrical contractors in Los Angeles, who recently moved from Main St. to 1523 West Seventh St., have again moved to a new store at 1521 West Seventh St., where they have started the manufacture and merchandising of a combination electric and neon sign.

The Pico Electric Company is a new shop opened at 2689 West Pico St., Los Angeles, Calif. A complete line of appliances and radio will be merchandised from this shop.

Mapmakers

Archie Cline, Clines Electric Shop, and E. O. Jacobsen, Valley Electric, are putting San Luis Obispo on the map electrically.

Personals

One of Industry's Leaders Is N.E.L.A. President

RECOGNIZED as one of the industry's energetic leaders, famous for his ability to establish good public relations, **Preston S. Arkwright**, president of the Georgia Power Company, Atlanta, has added to his many duties those of president of the National Electric Light Association. He was elected

PRESTON S. ARKWRIGHT

to the office at the convention in Atlantic City.

Mr. Arkwright has been nationally prominent in electrical circles for a number of years. Following his graduation in law from the University of Georgia in 1891, he practiced law in Atlanta for ten years, becoming one of the city's best known attorneys. In 1901 he became vice-president of the Georgia Electric Light Company, and the following year was elected president of the Georgia Railway & Electric Company. When the Georgia Railway & Power Company was formed in 1912 he was made president of the new company. Fifteen years later when that company was consolidated with about twenty other public utilities to form the Georgia Power Company, Mr. Arkwright became president of the consolidated company. Approximately 180 cities and towns are supplied electric service by the companies under his direction.

Mr. Arkwright has always been very active in association affairs. Last year he served as first vice-president of the association and chairman of its civic development committee. By virtue of his election to the presidency he becomes chairman of the Charles A. Coffin prize committee. He is also vice-president of the Association of Edison Illuminating Companies and a former president of the Southern Gas Association. Mr. Arkwright brings to the leadership of the National Electric Light Association thorough legal knowledge, wide experience in the electrical industry and the sound executive ability which enabled him to build up a consolidated system in Atlanta out of a troubled and disorganized situation.

W. P. Bear, of the sales department, Pacific Gas and Electric Company, San Francisco, spoke on "Street Lighting" at a recent luncheon meeting of the Mutual Business Men's Association at the Palace Hotel in that city.

W. C. Hornberger, vice-president and general manager, Arizona Edison Company, Phoenix, recently made a visit to New York to confer with officials of the Peoples Light & Power Corporation, of which the Arizona company is a subsidiary.

S. S. Perry, president, Arizona Power Company, Prescott, accompanied by Mrs. Perry, has been spending some time in Arizona with **L. V. Seares**, vice-president of the company, in connection with its affairs. Mr. Perry formerly resided in Prescott but for the past six months has been in the East attending to his holdings there.

G. O. Hodgson, district sales manager, Edison Lamp Works, Denver, not long ago made a business trip to Cleveland, Harrison, N. J., and New York.

O. L. Mackell, Public Service Company of Colorado, Denver, treasurer of the Electrical League of that state, and a charter member of the advisory board, a short while ago made an extended trip throughout the eastern section of the country. Mr. Mackell visited numerous utility companies on this inspection tour.

E. L. Dee, Edison Mazda Lamp agent in Salt Lake City, is among the members of the electrical fraternity who recently made an Eastern trip.

J. A. Kahn, president, Capital Electric Company, Salt Lake City, motored to the quarterly convention of the National Electrical Wholesalers Association held recently in Del Monte, Calif.

J. B. Ledlie, superintendent, Mesilla Valley Electric Company, Las Cruces, N. M., has been re-elected secretary of the local Rotary Club for the fourth consecutive time.

Guy A. Barker, manager of the Pacific Division, electrical and public utilities department, Johns-Manville, Inc., of California, spent the month of July in a trip through the Northwest, visiting Portland, Seattle, Salt Lake and points in Idaho.

A. W. Leonard, president, Puget Sound Power & Light Company, Seattle, recently returned from an extended trip to Eastern points, including Boston and New York. While East he also attended the convention of the National Electric Light Association at Atlantic City.

J. I. Colwell, of the Graybar Electric Company, Seattle, recently returned from a trip to New York, where he visited the headquarters of the company.

William Tierney, of the General Electric Company in Seattle, left a short while ago on a business trip to the company's plant in Schenectady. He will also visit New York and other Eastern centers.

Northwest Association's President Well Known

THE new president of the Northwest Electric Light and Power Association, **Richard M. Boykin**, manager of the Puget Sound Power & Light Company's central district, with headquarters in Seattle, is one of the most prominent electrical men in that section of the country. He has always played an active part in the affairs of the association and has served it in various capacities. This is the second time that he has been its president, his first administration covering the year 1924-25. During the year 1926 he was chairman of the Public Relations Sec-

RICHARD M. BOYKIN

tion. Mr. Boykin is also active in the work of the local section of the American Institute of Electrical Engineers and in the Seattle Electric Club, of which he is president.

A resident of the Northwest for the past sixteen years, Mr. Boykin started his career in the electrical industry in that territory as owner and operator of an electrical system at Hillsboro, Ore. Through a series of mergers this company became part of the North Coast Power Company, of which Mr. Boykin was made vice-president and general manager. When that company in turn was absorbed by the Puget Sound Power & Light Company, he became manager of its southern district. He held that post until the latter part of 1924 when he was appointed to the managership of the company's central district.

Mr. Boykin is very popular among the members of the electrical fraternity, and under his leadership the association should make good progress.

A. E. Hitchner, Los Angeles district manager, Westinghouse Electric & Manufacturing Company, won the Los Angeles Electric Club golfing championship for the coming year at the annual golf tournament held a short time ago.

R. H. Hopper has been made manager of the Pacific Power & Light Company's district office at Pomeroy, Wash.

A. J. Lutz, manager, Pacific States Electric Company, Seattle, accompanied by **Verne Harrison** of the same firm, recently spent several weeks in Alaska.

P.C.E.A. President Is Fine Type of Executive

FOLLOWING a logical sequence, **Paul M. Downing**, vice-president in charge of electrical construction and operation, Pacific Gas and Electric Company, San Francisco, who during the past year served as vice-president of the Pacific Coast Electrical Association, was elected president at the annual convention in Pasadena.

Mr. Downing's experience in the electrical industry has been wide. He began his career as dynamo tender with the Tacoma Light & Power Company, Tacoma, was assistant motor inspector and powerhouse operator for the Market

PAUL M. DOWNING

Street Railway Company in San Francisco, and then in 1897 became station superintendent of the powerhouse at Blue Lake City, Calif., one of the first hydro plants in California. The next year he became associated with John Martin as agent for the Stanley Electrical Manufacturing Company. The next steps upward were those of chief electrician for the Standard Consolidated Mining Company, Bodie, Calif., manager of the Colusa Gas & Electric Company, Colusa, and division superintendent of the Bay Counties Power Company, San Francisco, in charge of the transmission and distribution of power. The transmission voltage from the powerhouse was 45,000, which was then the maximum voltage in the world. In 1903 Mr. Downing became superintendent of substations for the California Gas & Electric Corporation and operating engineer for that company and for the Pacific Gas and Electric Company, which later took it over. Successsively he held the positions of division superintendent, operating engineer, and engineer of operation and maintenance. He continued in the latter capacity for nine years when he was appointed chief engineer of the electrical department. In January, 1920, he was made vice-president of the company in charge of electrical operation, and shortly thereafter the duties of supervision of electrical construction were added.

A man of fine physical presence, a ready and forceful speaker, Mr. Downing is that high type of executive who is able to gather about him men of ability and weld them into an efficient working unit. With such a leader, the Pacific Coast Electrical Association should add materially to its record of progress.

Henry Peterson, manager of the electrical department of Schwabacher's in Seattle, left not long ago for a month's trip to New Jersey and other Eastern points.

Frank Parrish, of the Fobes Supply Company, Seattle, recently made a month in Minneapolis, Philadelphia and New York City.

A. W. Wilson, of the Fobes Supply Company, Seattle, recently made a month's trip to Chicago, New York and other Eastern cities. While away he attended the radio show in Chicago.

F. B. Lewis, vice-president in charge of operations and assistant general manager, Southern California Edison Company, Los Angeles, has returned from a three months' trip through Europe.

George Bakewell, Jr., executive manager, Electrical League of Colorado, Denver, is attending the electrical league's conference at Association Island, N. Y. On his return he will stop at Chicago to attend the Electragists' convention to be held there Aug. 6-10.

A. F. Morairty, assistant general manager, Central Arizona Light & Power Company, Phoenix, recently made a trip to New York to confer with company officials. While in the East Mr. Morairty attended the National Electric Light Association convention in Atlantic City.

Robert A. Millikan, director of the Norman Bridge Laboratory of Physics, California Institute of Technology, Pasadena, has been awarded the honorary degree of doctor of science by Princeton University in recognition of his scientific studies on the electron.

Lewis A. Lewis, sales manager, The Washington Water Power Company, Spokane, recently returned to that city from New York where he conferred with company officials. Mr. Lewis also attended the National Electric Light Association convention in Atlantic City.

Is Rocky Mountain District Engineer for G.E. Co.

THE newly appointed district engineer of the General Electric Company for the Rocky Mountain territory is **L. M. Stauffer**, who since November, 1925, has been a member of the engineering department of the company's Denver office. Mr. Stauffer succeeds A. L. Jones, who has been promoted to the position of district manager.

Mr. Stauffer began his college career at the California Institute of Technology, Pasadena. The World War intervened, however, and he enlisted, serving one year in France as second lieutenant in the Railway Artillery Section. After the war, college was resumed, Mr. Stauffer transferring to Stanford University at Palo Alto to take his senior and graduate work under Prof. Harris J. Ryan, head of the electrical department and past president of the American Institute of Electrical Engineers. Mr. Stauffer was graduated in 1922 with the degree of A.B., and in 1923 received the degree of E.E. During his college course he worked in all sections of the municipal light and power department of the City of Pasadena where he obtained some practical central station experience, and during his graduate year he had charge of the high-tension laboratory at Stanford, the forerunner of the university's present 2,000,000-volt laboratory.

After graduation he entered the employ of The Midwest Refining Company, Casper, Wyo., where he was soon promoted to the position of electrical de-

L. M. STAUFFER

signer in charge of the Salt Creek electric plant and also of all transmission lines, substations and secondary distribution. For a short time after its completion he operated this plant.

In November, 1925, he accepted a position in the engineering department of the Denver office of the General Electric Company. In January, 1926, he was placed in charge of the installation of the million and a half dollars' worth of electrical equipment at the Colorado Fuel & Iron Company's plant, Pueblo. He is credited with unusual skill and judgment in supervising this installation.

Mr. Stauffer's appointment has caused no small number of favorable comments from customers.

Obituary

Mrs. J. M. Perlewitz, wife of J. M. Perlewitz of the Graybar Electric Company, Salt Lake City, and vice-president of the Electrical League of Utah, died in that city June 29.

John Thompson, in charge of line patrol work on the Coeur d'Alene Indian Reservation and later at Wolf Lodge for The Washington Water Power Company, Spokane, died July 3 at his ranch near Wolf Lodge, Idaho. Mr. Thompson, who had been in the employ of the company since 1904, was 73 years of age.

Manufacturer & Distributor

Garnett Young & Company Announce Staff Changes

Arthur E. Rowe, for the past seventeen years district sales manager for **Garnett Young & Company**, San Francisco, has resigned on account of continued illness, according to announcement of Garnett Young, general manager of the company. Mr. Rowe at present is recuperating at Colorado Springs. Prior to his connection with Garnett Young & Company he was city sales manager for the Electric Appliance Company.

ARTHUR E. ROWE

Ralph B. Peterson has been appointed to succeed Mr. Rowe, with headquarters in San Francisco and with jurisdiction over sales in northern California and Nevada. The appointment became effective July 1.

RALPH B. PETERSON

Mr. Peterson joined the Telephone-Electric Equipment Company (predecessor of Garnett Young & Company) in 1907, worked his way through the shipping and service departments and eventually joined the San Francisco sales force where he remained until he entered the service. After two years in the Engineering Corps he returned to his old job. Three years ago he was appointed assistant district sales manager.

The position held by Mr. Peterson in the San Francisco district corresponds with that held by R. J. McHugh in the southern California territory and F. G. Larkin in the Northwest. Each district sales manager directs his respective sales staff and reports to Garnett Young, general manager at the home office.

Garnett Young & Company are exclusive Pacific Coast agents for the Chicago Signal Company, Hart & Hegeman Manufacturing Company, Harvey Hubbell, Inc., National Electric Corporation (formerly National Metal Molding Company), Simplex Wire & Cable Company and Stromberg-Carlson Company.

Six-Week Campaign Results in Sale of 347 Ranges

A Westinghouse electric range campaign extending over a six-week period by The Washington Water Power Company, Spokane, resulted in the sale of 347 ranges on the system of the company in the sixteen counties it serves. Of that total there were 180 sold in the City of Spokane. Only one model was featured, on which the price was slightly reduced. The down payment of $9.75 and a Westinghouse automatic electric iron were given with each range as a premium.

Leading salesmen and agents in the campaign received electric ranges in recognition of their efforts.

Pacific Coast Representative Named—Wallace R. Lynn has been appointed Pacific Coast representative of **The Belden Manufacturing Company**, Chicago. Mr. Lynn will handle the automotive, electrical and radio lines which are merchandised exclusively through jobbers and dealers.

Makes Business Trip Through Northwest—H. F. Hartzell, vice-president and general manager, **Maydwell & Hartzell, Inc.**, San Francisco, recently made a trip to the Northwest in the interests of the various factories which the firm represents. His itinerary covered Portland, Seattle, Spokane, Butte and Helena.

Attends Sales Conference—C. Dent Slaughter, San Francisco, recently left for Pawtucket, R. I., to attend a sales conference of the Tubular Woven Fabric Company. While East he plans to visit also the other factories which he represents, including the Trumbull-Vanderpoel Electric & Manufacturing Company, and the Rockbestos Products Corporation, New Haven, Conn.

Large Contract for Pumping Equipment Awarded

A large contract for pumping equipment has been awarded **The Pelton Water Wheel Company**, San Francisco, by the West Stanislaus Irrigation District, Westley, Calif., the total amount of which exceeds $80,000. Seventeen 26-in. Pelton-Moody spiral pumps are to be installed, three in one station at the junction of the San Joaquin and Tuolumne Rivers where water will be lifted 30 ft. and discharged into canals. The remaining pumps will be distributed among five other stations for elevation of water to other canals and laterals of the irrigation district.

The first three pumping units will be direct connected to 200-hp. General Electric motors; the rest will be driven by 150-hp. motors. The General Electric Company also has the contract for all the transformers.

The Butte Electric & Manufacturing Company of San Francisco has been awarded the contract for electrical installation.

Winged Cleaners

Two complete Premier Duplex vacuum cleaners, manufactured by the **Electric Vacuum Cleaner Company, Inc., Cleveland**, were among the first mail carried by the Colonial Western Airways plane when it made its inaugural flight to Albany, N. Y. The shipment was made to fill an order for two special-voltage cleaners.

"To the best of our knowledge, this was the first time electric vacuum cleaners were shipped as regular air mail," says the company in connection with this effort to effect prompt delivery.

To Handle Radio Products—The radio products manufactured by the **Kellogg Switchboard & Supply Company**, Chicago, will be distributed in northern California and western Nevada by the Fobes Supply Company, San Francisco.

West Coast Electric Sales Company Organized

The West Coast Electric Sales Company has been incorporated and has completed organization to carry on sales and distribution engineering in the West Coast territory, according to announcement of M. J. Corwin, president and general manager. Its main office and warehouse are situated at 1063 Howard St., San Francisco. The principal interests being served include the independent telephone companies and the radio trade.

Some of the companies represented by the West Coast company include American Electric Company, Inc., Runzel-Lenz Electric Manufacturing Company, Trav-ler Manufacturing Corporation, Liberty Transformer Company, and High Frequency Laboratories, all of Chicago, Carbon Products Company, Lancaster, Ohio, Copperweld Steel Company, Glassport, Pa., and Habirshaw Cable & Wire Corporation, New York.

Establishes Warehouse and Service Depot

Announcement is made by the **Van Dorn Electric Tool Company,** Cleveland, that its sales branches in Los Angeles, San Francisco and Seattle and its service branches in Los Angeles, Oakland and Seattle, have been supplemented by the establishment of a complete warehousing and service depot at 525 East Tenth St., Oakland, Calif. A full stock of both Van Dorn and Van Norman products will be carried in the Oakland warehouse, and all Pacific Coast shipments will be made direct from that point, with freight allowance equivalent to full freight allowed on shipments of more than 100 lb. at one time. All machine orders should be sent to the nearest sales office and all service orders to the nearest service branch.

Sales departments will be operated separately at 857 South San Pedro St., Los Angeles, 75 Fremont St., San Francisco, and 514 Virginia St., Seattle, with Waldo H. Bair, Harry W. White and Roy Wise, branch managers, respectively, in charge.

Change in Sales Organization—H. T. Weeks, U.S. National Bank Building, Denver, has been placed in charge of sales in Colorado, Utah, Wyoming and northern New Mexico for the **Roller-Smith Company,** New York City. Mr. Weeks will handle the company's entire line, including electrical measuring instruments, relays and circuit breakers.

Frederic L. Tomlinson, who has operated in several Pacific Coast cities as electrical and radio manufacturers' agent, has opened offices at 701 Mercantile Arcade Building, Los Angeles, where he is making contacts with manufacturers in regard to taking on additional lines.

Firm Combines Offices and Display Rooms

Not only offices but display rooms are the new quarters of **Jones-Lyman & Company, Inc.,** in the Russ Building, San Francisco. Oliver B. Lyman is shown seated behind his desk, dictating to his office assistant, Tom J. Ayres, son of K. B. Ayres, superintendent of transmission distribution for the San Diego Consolidated Gas & Electric Company.

The equipment displayed includes a 600-amp., 220-volt, I-T-E LL type, 3-pole, 2-coil circuit breaker with rigid arm, shown at the left in the foreground. Below it is a 220-volt, 200-amp., U-Re-Lite circuit breaker. On the other side of the door is a Sundh Electric Company specially assembled panel to show pilot lights, pressure regulators and remote control contactors of mechanical and electrical type for demonstration work.

Transferred to San Diego—R. E. Larsen, of the merchandising division of the **Westinghouse Electric & Manufacturing Company,** recently was transferred from the Los Angeles office of that company to San Diego where he has headquarters with the Electric Supplies Distributing Company, 435 Second St.

N.E.M.A. Elects New Head—H. B. Crouse, president of the Crouse-Hinds Company, Syracuse, N. Y., was elected president of the **National Electrical Manufacturers Association** at its recent annual meeting at Hot Springs, Va. He succeeds Gerard Swope, president of the General Electric Company, who retains membership on the board of governors and on the executive committee of the association.

Fixture Company Changes Address—L. A. Hobbs, Pacific Coast district manager for the **Edwin F. Guth Company,** St. Louis, has removed his office to 407 Call Building, San Francisco.

Takes Charge of Office—**The Robinson Sales Company,** Polson Building, Seattle, has transferred R. O. Flatland to Portland where he will have charge of the company's office in that city.

Correction—**The A. G. Manufacturing Company,** Seattle, has announced that C. L. Zeller has been moved to Portland from Seattle and W. I. Downie is taking his place in the company's sales organization. This corrects an item which appeared on page 647 of the June 1 issue of Electrical West.

Robbins & Myers, Inc., New Name of Firm

Announcement has been made that **Robbins & Myers, Inc.,** Springfield, Ohio, has purchased all of the assets of the Robbins & Myers Company, including the Robbins & Myers Company of Canada, Ltd., from W. J. Myers, receiver of the former company, and is in a better position to serve its customers than ever before. Working capital amounts to more than $2,000,000 in quick assets, it is stated, and less than $50,000 of accounts payable.

The officers of Robbins & Myers, Inc., are W. S. Quinlan, president; C. A. Stirling, vice-president and general sales manager; O. C. Burmeister, secretary; H. I. Smeltzer, treasurer; and W. W. Mumma, fan sales manager. All of the above have been connected with the old Robbins & Myers Company, and no change in personnel is contemplated.

W. J. Myers, who for the past six months has acted as receiver for the former company, recently was elected vice-president and general manager of Robbins & Meyers.

Consolidation of Fixture Concerns—Consolidation of the **Cascade Fixture Company** and **H. C. Lynde, Inc.,** manufacturers of electric fixtures, both of Seattle, has been announced. The factory of H. C. Lynde will be discontinued, and the concern will operate under the name of the Cascade Fixture Company, at 1714 Yale Ave. H. E. Gleason, president of the Cascade Fixture Company, will be president of the new concern, and H. C. Lynde will be designer.

Operating Division Taken Over by New Firm

Announcement has been made by the **Smith-Booth-Usher Company** through its president, H. P. Usher, that the Jenison Machinery Company of San Francisco has acquired the good-will, stocks of machinery and equipment of the San Francisco division operating in northern California. E. S. Jenison, president of the new company, has been vice-president in charge of the San Francisco Division for the Smith-Booth-Usher Company since 1925, and he and his associates will continue the business along established lines, according to the announcement.

Announcement further is made to the effect that The Stuart S. Smith Company will liquidate and that Stuart S. Smith, formerly president, will become manager of the construction equipment division of the Jenison Machinery Company and one of its vice-presidents and directors.

Rocky Mountain District Manager Appointed—O. H. Davidson, president, O. H. Davidson Equipment Company, 130 West Fourteenth Ave., Denver, has been appointed district manager in the Rocky Mountain territory by the **Oliver Iron & Steel Corporation,** Pittsburgh. Mr. Davidson will represent the company's pole line material and bolt, nut and rivet departments.

Lindsey Sales Company, formerly located in the Textile Bldg., San Francisco, has moved into new quarters at 1213 South Main St., Los Angeles, Calif. This firm, in addition to representing manufacturers of lighting fixtures and illuminating glassware, is opening a new service to electrical dealers in the form of complete engineering planning and advisory service to all dealers and contractors without cost.

New Portland Manager Appointed—The appointment of Harry W. Brown as manager of its Portland branch has been announced by **The Electric Corporation.** Mr. Brown succeeds Albert Rives who has resigned.

Alexander & Lavenson, 926 Howard St., San Francisco, have announced that Charles R. Musladin, formerly a member of their organization and more recently connected with George Campe, Inc., is again associated with their firm.

Schweitzer Bros., Inc., manufacturers of lighting fixtures, have moved into new and attractive quarters at 2837-39 West Pico St., Los Angeles. They were formerly at 1233 West Pico St.

Electro-Kold Corporation, Spokane, announces that it has appointned Oakley & Son, Boise, as it distributors for southwestern Idaho.

Calls on Western Representatives—H. Clifford Campion, Jr., general manager, **I-T-E Circuit Breaker Company,** Philadelphia, accompanied by Mrs. Campion and family, recently spent two weeks in southern California followed by several days in San Francisco. They returned to the East by way of the Northwest. During his visit Mr. Campion called upon Otto Demmert, Los Angeles, Oliver B. Lyman, San Francisco, and Burton R. Stare, Seattle, who represent the I-T-E company on the Coast.

Spokane Manufacturer Announces Lines—Electric boilers using a coil heating system with a special unit will be manufactured in Spokane by the **Sunbeam Electrical Corporation,** of which Leo Shuman is president. Cabinet heaters, water heaters and sterilizers for the use of doctors and dentists will be in the new company's line.

Increase in Electrical Orders—For the six months ending June 30 orders received by the **General Electric Company,** Schenectady, amounted to $170,375,797 as compared with $155,655,828 for the first six months of last year, an increase of 9 per cent.

New Spokane Headquarters for Jobber—A new two-story building being erected at S-122 Monroe St., Spokane, is to be occupied by the **Pacific States Electric Company** in that city.

Change in Name—Alex Hibbard, Inc., is the new name of the Hibbard-Weedon Electric Company, Denver. Mr. Hibbard is in full charge.

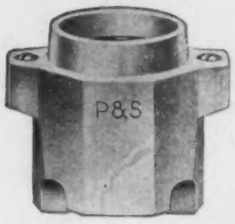
New Equipment

Wiring Devices

A number of new wiring devices have been added to its line by **Pass & Seymour, Inc.,** Syracuse, N. Y. These include: A bracket supporting switch—

This not only acts as switching mechanism for a wall bracket but also holds the bracket to the wall, thereby eliminating the necessity of the hole which is usually drilled to accommodate a canopy switch. The strap, which can be detached, is an important part of this switch since it is possible to install it conveniently on boxes with or without ears or studs in either the 3¼-in. or 4-in. size.

A sign receptacle for floodlights No. 418—The center contact of this device



is so constructed that it acts as a lamp grip and, therefore, prevents the lamp from loosening as a result of vibration.

Porcelain angle socket No. 877—This has a ⅜-in. angle cap with set screw in the cap for use in lighting show windows, show cases and other places where small angle sockets are desired.

Pendant cap with cord grip, No. CR, and No. PY (porcelain), that prevent strain on terminals and wire coverings from raveling; pull chain canopy switch No. 3317, which is exceedingly shallow and can be conveniently installed in a small space; and a canopy supporting switch, No. 3310, for use with wall brackets are also new.—Electrical West, August, 1928.

Expansion Anchors

The manufacture and marketing of Hi-Tension 4-in-1 expansion anchors has been announced by the **James R. Kearney Corporation,** 4224-32 Clayton Ave., St. Louis.

These anchors are manufactured in four sizes, 6 in., 7 in., 8 in. and 10 in., are made of certified malleable iron, guaranteed against breakage, and are suitable for use in any kind of hard soil at any angle, to any depth, in any location, according to the manufacturer's statement. Particular features of this anchor include its use as an expanding anchor, as a plate anchor, as a cone anchor and as a metal plug anchor. It expands to two and one-half times its rated size.—Electrical West, August, 1928.

Heavy-Duty Electric Drill—A ¾-in. heavy-duty portable electric drill, recently put on the market by **Black & Decker Manufacturing Company,** Towson, Md., has been designed to meet the need for a powerful drill of ¾-in. capacity to take straight shank drill bits. This drill is equipped with an exceptionally powerful universal motor, operating on direct or alternating current, and the armature and spindle thrust are mounted on ball bearings. The 3-jaw geared chuck uses straight shank bits, and the drill will readily drill holes up to ¾ in. in diameter in the toughest steel. List price, $78.—Electrical West, August, 1928.

Apartment Compact Electric Range

A still further development in apartment ranges is announced by the **Benjamin Electric Manufacturing Company**, 128 South Sangamon St., Chicago, in offering the apartment compact electric range designed especially for built-in and floor installations in the modern apartment dwelling where space is extremely limited.

Features of design and construction as embodied in the regular Benjamin electric ranges are retained in the apartment compact, such as thoroughly insulated heat retaining oven; interchangeable oven units and removale oven slides which facilitate easy cleaning; long-life, quick heating coils and automatic heat control and precision oven thermometer.

The new range is supplied in two models, B83 and B81, with choice of two finishes in combinations of white porcelain enamel and black baking japan in each model and with further option of two or three-burner cooking top. Model B83 is especially desirable for built-in installation in wall or kitchen cabinet and Model B81, with 10½-in. legs, provides a neat, compact floor installation. — Electrical West, August, 1928.

Rubber Refrigerator Trays

Under the name "Copeman" white rubber ice trays for regriferators are being introduced by the **Hartwell Rubber Company, Inc.**, 5 East 44th St., New York. These trays may be emptied

easily and quickly merely by a twist of the flexible tray; the ice cubes do not stick to the sides, and the usual difficulties encountered in removing the cubes are eliminated.

The trays are adaptable to all automatic refrigerators and may be obtained in various capacities. The intended list price, according to size, is $1.50 to $2.50.—Electrical West, August, 1928.

Percolator Sets

Four-cup, six-cup, and nine-cup electric percolator sets and a nine-cup urn set are being offered by **Hemill Products, Inc.**, 103-105 Mott St., New York.

The illustration shows No. 06162 six-cup set complete with tray 12 in. in diameter, exclusive of handles, with creamer and covered sugar bowl, 4 in. high, gold lined. The set complete lists at $20, the percolator alone at $10.50, the tray at $2.50, creamer and sugar bowl $7 each. The four-cup set complete lists at $16.50, the nine-cup at $23, and the urn at $26.

The percolator is made of a heavy, silvery white, stainless nickel on a

copper base, insuring good wearing qualities and making the device easy to clean. The bottoms of the trays are made in a natural metal crackled design to prevent scratching and marring. All the percolators are provided with 6-ft. silk cords and plugs, and each appliance carries on the nameplate an unconditional guarantee.—Electrical West, August, 1928.

Oil Circuit Breaker

An oil circuit breaker of relatively high interrupting capacity and comparatively small overall dimensions, known as the type D-131, has been placed on the market by the **Condit Electrical Manufacturing Corporation**, Boston. In the development of this type D131, there have been retained time-proved features of the type D-21, together with certain additional features which recent research and field practice have proved sound, the maker states. The type D-131 oil circuit breakers are built for 400, 600, 800 and 1,200 amp. at 15 kv. and 1,600 amp. at 7.5 kv., with an estimated interrupting capacity of 7,000 amp. at 15 kv.—Electrical West, August, 1928.

Armored Appliance Plug

An armored appliance plug, catalog No. 104, has been placed on the market by the **Eagle Electric Manufacturing Company**, 59 to 79 Hall St., Brooklyn,

N. Y. This plug has a genuine phosphor bronze wipe contact clip, armorclad to prevent breakage. It will fit all American-made appliances, and is marketed in units of ten in a convenient container.—Electrical West, August, 1928.

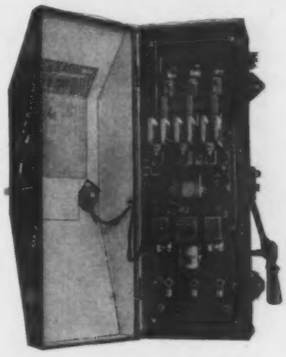
Multiple Control Lens Systems

Multiple control lens systems for the lighting of hospital operating rooms have been announced by the **Holophane Company, Inc.**, 342 Madison Ave., New York City. These systems consist in effect of one huge lens, approximately 12 ft. long by 6 ft. wide, made in sections, housed in steel framework, with metal sides and top, forming a complete self-contained enclosure, completely wired and supplied with sockets and reflectors, capable of being installed exposed on the under side of the ceiling or flush in a furred ceiling.—Electrical West, August, 1928.

Resisto-Transformer Starter

Bulletin 648 resisto-transformer starter is a new addition to the line of motor starters manufactured by **The Allen-Bradley Company**, 286 Greenfield Ave., Milwaukee.

The starter is a combination of the graphite compression resistor and the



auto-transformer (compensator) type of starter, thereby obtaining stepless acceleration with low current input. Large squirrel-cage motors can be started without causing line voltage jolts, or dimming lights combined in the same network.—Electrical West, August, 1928.

,Portable Ironer

A new type portable speed ironer has been announced by the **Hurley Machine Company**, Chicago.

The new machine is made in two models. The No. 0 operates from the wringer shaft of a Thor 2, 6 or 8 washing machine; the wringer is removed and the ironer set in its place for ironing. It is small enough to be carried with ease and occupies no more space than a vacuum cleaner when put away in a closet or corner after use, according to the manufacturer. The No. 10 model is a complete portable table ironer with base and enclosed motor. Both models have a 1,250-watt heating element which provides heat in four minutes. The No. 0 will sell retail east of the Rockies for $49.50, the No. 10 for $79.50.—Electrical West, August, 1928.

Electric Washer

The new Fedelco percelain electric clothes washer has been announced by the **Federal Electric Company,** 8700 South State St., Chicago.

Features of the Fedelco washer are: porcelain square tub; three-way washing principle; non-corrosive metal multi-blade reversing impeller agitator; no-oiling safety unit power plant (no oil or grease cup to fill); 8-position, 12-in., button-protecting cushioned rubber rolls; wide drainboard; instant safety-release; aluminum lid which may be removed without swinging aside the wringer; height of tub adjustable from 29½ to 35½ in. to suit convenience; ¼-hp. motor. The washer requires only 23 x 23 in. of floor space and washes 60 lb. of clothes per hour, the manufacturer states.—Electrical West, August, 1928.

Cigar Lighter

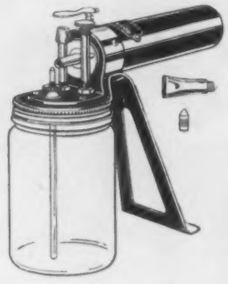
A wireless electric cigar lighter for installation on the instrument board of an automobile is being marketed by the **Stewart-Warner Speedomoter Corporation,** Chicago.

Easily installed through a tiny hole in the instrument board, this lighter does away with reel and trailing wire, according to the manufacturer. This Pass-a-Lite lighter is simple in operation. When the bowl is depressed in its nickel base the heating element glows red, and it is only necessary to put out the bowl and "Pass-a-Lite" anywhere, like a match. Price complete $2.50—Electrical West, August 1928.

Sprayer for Vacuum Cleaners

A new model of its Royal sprayer vacuum cleaner attachment has been developed by **The P. A. Geier Company,** Cleveland.

This model "D" is supplied with two interchangeable nozzles for controlling the air stream, a round nozzle for fine work, such as the painting of chair legs and spindles, and a fan spray nozzle for rapid covering of large surfaces. There are two interchangeable nipples for the paint tube: one with a small aperture, which, in combination with the round air nozzle, will give a spray stream of less than 1 in.; the other, or larger aperture, in combination with the fan spray nozzle, will deposit a spray approximately 4 in. wide. This latest model sprayer is provided with an over-



size rubber-tipped vent tube controlled by the same thumb button as the spray itself. When the spray is cut off, the air pressure within the paint container is instantly and automatically released so that there is no after-flow from the paint tube. A light stamped steel support holds the sprayer and jar upright when not in action.

The improvements on this Royal sprayer, which will be sold independent of the company's cleaner, adapt it for use on vacuum cleaners having relatively weak suction. The suggested fesale price is $4.95.—Electrical West, August, 1928.

Portable Air Compressors

A seventh size has been added to its line of portable air compressors by **Ingersoll-Rand Company,** 11 Broadway, New York.

This new size (4¾-in. bore by 4-in. stroke) has a piston displacement of 82 cu.ft. per minute. It is intended primarily for use by contractors, public utilities, cities and towns requiring a unit of slightly larger capacity than the 4¼ x 4 in., 66-cu.ft. machine.

The new compressor, like the other I-R portables, is equipped with a four-cylinder, tractor-type motor. It is available on broad-faced steel wheels, on steel wheels with rubber tires, on I-R trailer mounting, on Ford or Chevrolet truck, or without running gear for mounting on skids, railway cars and similar equipment.—Electrical West, August, 1928.

Compressor Units—Two new styles of compressor units, Type A ½ hp., and Type AA 1 hp. water-cooled machines, have been announced by the **Electro-Kold Corporation,** Spokane. These two types give Electro-Kold an alternative between the two present Type A and Type AA air-cooled, so that water-cooling may be used where necessary, the manufacturer states. These types are used chiefly for commercial and apartment installations. — Electrical West, August, 1928.

Heavy-Duty Reflectors and Holders

The Ivanhoe Division of **The Miller Company,** Cleveland, has announced a new line of porcelain enameled steel reflectors in the R.L.M. dome, shallow dome, standard bowl, standard angle and Glassteel diffuser types with a rolled threaded neck of heavy gage copper. These collars are securely locked into the form and will not become loosened or turn in service.

Holders are available for these reflectors in cast aluminum and stamped enameled steel for attachment direct to the outlet box, also suspension types tapped for ½-in. pipe of stamped enameled steel or cast iron. These holders are supplied with either medium or mogul porcelain sockets.—Electrical West, August, 1928.

Cord Grip Plug Cap

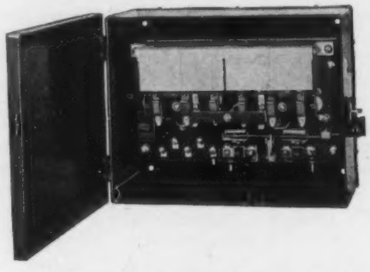
An unbreakable attachment plug cap with an improved type of cord grip is announced by the **Cutler-Hammer Manufacturing Company,** 153 Twelfth St., Milwaukee. The cord grip acts as a positive strain relief and is designed particularly to lessen short circuit hazards, states the maker. Fastening the cord grip is an extremely simple matter and can be done without the use of tools. It is only necessary to screw down on the knurled collar.

The knurled collar wedges a fibre bushing tightly against the cord. The parts are so designed that a natural pressure from the inside prevents loosening of the knurled collar and insures that a firm grip is maintained at all times.—Electrical West, August, 1928.

Reversing Starter

A new automatic reversing starter for alternating current, rated at 15 amp., all voltages, has been added to its line by the **Industrial Controller Company,** Milwaukee.

This device provides remote control,



low voltage and overload protection, and is arranged for either two or three-wire control. The Class 8732 starter has two mechanical inter-locked contactors and is provided with thermal overload relays. Class 8712 is of similar construction and is furnished without overload relays. The mechanism is entirely enclosed in a steel cabinet with baked enamel finish.—Electrical West, August, 1928.

Recent Publications

"Home of Ideas"—In this 16-page bulletin (which is a new and revised edition) the **Bryant Electric Company,** Bridgeport, Conn., presents the architect's front elevation, the various floors, and an attractive view of each room in this "Home of Ideas." The house is completely and economically equipped from the standpoint of wiring device installations. The company states that it takes special pleasure in distributing the bulletin in the belief that its readers may be helped in a wider understanding of the Red Seal plan. Copies will be forwarded promptly upon request.

Electric Water Heating Test—Hynes & Cox Electric Corporation, Albany, N. Y., has announced that it will be glad to send upon request to anyone interested a copy of the "Reports of Electric Water Heating Test on Low Wattage Heaters," conducted at Russell Sage Laboratory, Rensselaer Polytechnic Institute, Troy, N. Y. These reports have been prepared in booklet form for distribution.

Conduit Fittings—The Adapti Company, 2996-3004 East 72nd St., Cleveland, has announced the publication of its supplementary catalog No. 107-A. This catalog supplement features the company's new line of Adapti-lets (solid fittings), also fixture elbows, plug and base receptacles, and self-aligning fixture joints for use with Adapti-lets, Adaptiboxes and all regular standard fittings.

Ice-O-Matic Refrigeration—A description of the Ice-O-Matic refrigerator, the different uses to which it may be put, an explanation of its mechanism, and illustrations of the style of cabinet adopted for its use are contained in a catalog recently distributed by the **Williams Oil-O-Matic Heating Corporation,** Bloomington, Ill.

Diesel-Electric Drive—A set of booklets dealing with this subject has been prepared by the **General Electric Company,** Schenectady, N. Y. The set includes "Diesel-Electric Drive," "Diesel-Electric Drive for Tugboats," "Diesel-Electric Drive for Ferryboats," "Diesel-Electric Drive for Passenger and Cargo Vessels," "Diesel-Electric Drive for Tankers," and two booklets dealing with electric motor and control equipment for deck and under-deck auxiliaries."

Magnetic Controllers—A four-leaf pamphlet published by **The Electric Controller & Manufacturing Company,** Cleveland, describes and illustrates its contactors, relays, resistors, master controllers, limit stops anl cut-outs.

"Modern Refrigeration in the Modern Color Setting"—This booklet is printed by **Servel Sales, Inc.,** Evansville, Ind., and presents in some detail the modern idea of color, particularly as applied to the kitchen. A number of illustrated suggestions are given for kitchen color schemes, centering about the Servel refrigerators, which may be obtained in crystal green, ivory tan, silver gray and Biscay blue, as well as white.

Street Lighting—Two catalogs, "Overhead Street Lighting Equipment" and "Ornamental Street Lighting," published by the **Westinghouse Electric & Manufacturing Company,** East Pittsburgh, give complete information on all street-lighting equipment and appliances manufactured by that company, and in addition describe and illustrate the equipment with photographs, dimentioned line drawings, charts, and line drawings with each part labeled.

Electric Water Heaters—Trade Bulle-No. 51-28, prepared by the **Automatic Electric Heater Company,** Philadelphia, describes its low-wattage, storage-type electric water heaters. The bulletin contains numerous illustrations and diagrams, and a table of operating data.

Automatic Control—"Speeding Up Production with Automatic Control" is the self-explanatory title of Bulletin No. 110, being distributed by the **Monitor Controller Company,** Baltimore, Md.

Super-Automatic Iron—A catalog supplement on the Hotpoint super-automatic iron and other new appliances has been issued by the **Edison Electric Appliance Company, Inc.,** Chicago.

High-Tension Bus Handbook and Catalog—This publication, No. 29, issued by the **Burndy Engineering Company, Inc.,** 10 East 43rd St., New York, contains 120 pages of engineering and commercial data concerning the high-tension bus, with tables, formulas, graphs and other information describing the design, construction and similar phases of bus work.

Arc-Welding Equipment—Under this title, with the subtitle "Variable-Voltage, Single Operator, vs. Constant Potential, Multiple Operator," engineering bulletin 206 is being distributed by the **Lincoln Electric Company,** Cleveland.

Wires and Cables—Two new bulletins have been issued by the **Rockbestos Products Corporation,** New Haven, Conn.—"Rockbestos A.V.C. Cables" and "Rockbestos Wires and Cables." Both illustrate the various wires in question and some of their many applications.

"The Radio Market"—The Radio Division of the **National Electrical Manufacturers Association,** 420 Lexington Ave., New York City, has announced publication of "The Radio Market." This is based on statistics gathered by the Department of Commerce in cooperation with the N.E.M.A. and is said to be a most comprehensive study. Copies may be obtained upon request of the association headquarters at a cost of $2 each.

Fine Switches and Wiring Devices—Under this title the **Hart & Hegeman Manufacturing Company,** 342 Capitol Ave., Hartford, Conn., has issued its catalog T. The catalog contains 120 pages with numerous illustrations.

Indoor Terminal Cables—This is the title of Catalog 711 being distributed by the **Standard Underground Cable Company,** Seventeenth and Pike Sts., Pittsburgh, Pa. The information contained in the catalog is in very complete form, and there are numerous illustrations, cross-sectional drawings and tables.

"Groundology"—Bulletin 70, entitled "The Groundology of Electro-grounds, Groundheads, Groundpoints and Groundometers," has been issued by the **Borden Electric Company,** formerly Groundulet Company, Newark, N. J. This bulletin, according to the company's announcement, is a pretty complete treatise on grounding methods for powerhouse, substation and large industrial plant installations. Copies will be furnished to interested parties without charge, upon request.

Protection for Lamps and Reflectors—A complete bulletin in colors describing and illustrating the new Benjamin dust-tight glass cover to protect lamps and reflectors of industrial lighting equipment from dust and dirt has been published by the **Benjamin Electric Manufacturing Company,** 120 South Sangamon St., Chicago.

Multi-Stage Centrifugal Pumps—A 30-page booklet featuring the Cameron line of multi-stage centrifugal pumps, Class "HMT-HST," is being distributed by **Ingersoll-Rand Company,** 11 Broadway, New York. Much attention has been given to the illustrations, which are very numerous.

Statistical Data for the Electric Light and Power Industry, 1927—This is the self-explanatory title of Bulletin No. 2, issued by the **National Electric Light Association,** 420 Lexington Ave., New York City.

Bearing Construction—Bulletin 156 of the **Wagner Electric Corporation,** 6400 Plymouth Ave., St. Louis, Mo., fully describes and illustrates the improved sleeve bearing and double-cap ball bearing construction employed by that company.

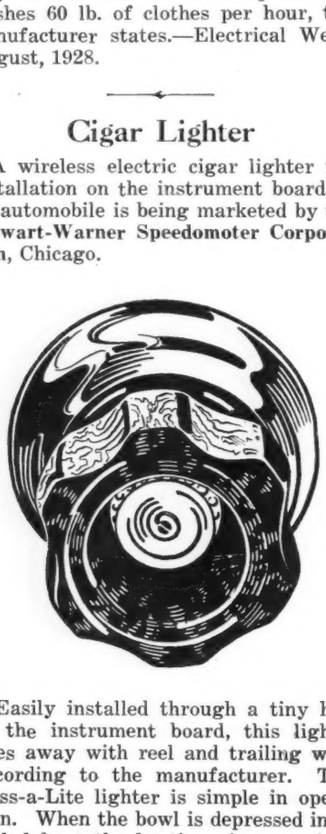
Electric Washer

The new Fedelco percelain electric clothes washer has been announced by the **Federal Electric Company,** 8700 South State St., Chicago.

Features of the Fedelco washer are: porcelain square tub; three-way washing principle; non-corrosive metal multi-blade reversing impeller agitator; no-oiling safety unit power plant (no oil or grease cup to fill); 8-position, 12-in., button-protecting cushioned rubber rolls; wide drainboard; instant safety-release; aluminum lid which may be removed without swinging aside the wringer; height of tub adjustable from 29½ to 35½ in. to suit convenience; ¼-hp. motor. The washer requires only 23 x 23 in. of floor space and washes 60 lb. of clothes per hour, the manufacturer states.—Electrical West, August, 1928.

Cigar Lighter

A wireless electric cigar lighter for installation on the instrument board of an automobile is being marketed by the **Stewart-Warner Speedomoter Corporation,** Chicago.



Easily installed through a tiny hole in the instrument board, this lighter does away with reel and trailing wire, according to the manufacturer. This Pass-a-Lite lighter is simple in operation. When the bowl is depressed in its nickel base the heating element glows red, and it is only necessary to put out the bowl and "Pass-a-Lite" anywhere, like a match. Price complete $2.50—Electrical West, August, 1928.

Sprayer for Vacuum Cleaners

A new model of its Royal sprayer vacuum cleaner attachment has been developed by **The P. A. Geier Company,** Cleveland.

This model "D" is supplied with two interchangeable nozzles for controlling the air stream, a round nozzle for fine work, such as the painting of chair legs and spindles, and a fan spray nozzle for rapid covering of large surfaces. There are two interchangeable nipples for the paint tube: one with a small aperture, which, in combination with the round air nozzle, will give a spray stream of less than 1 in.; the other, or larger aperture, in combination with the fan spray nozzle, will deposit a spray approximately 4 in. wide. This latest model sprayer is provided with an over-

size rubber-tipped vent tube controlled by the same thumb button as the spray itself. When the spray is cut off, the air pressure within the paint container is instantly and automatically released so that there is no after-flow from the paint tube. A light stamped steel support holds the sprayer and jar upright when not in action.

The improvements on this Royal sprayer, which will be sold independent of the company's cleaner, adapt it for use on vacuum cleaners having relatively weak suction. The suggested resale price is $4.95.—Electrical West, August, 1928.

Portable Air Compressors

A seventh size has been added to its line of portable air compressors by **Ingersoll-Rand Company,** 11 Broadway, New York.

This new size (4¾-in. bore by 4-in. stroke) has a piston displacement of 82 cu.ft. per minute. It is intended primarily for use by contractors, public utilities, cities and towns requiring a unit of slightly larger capacity than the 4¼ x 4 in., 66-cu.ft. machine.

The new compressor, like the other I-R portables, is equipped with a four-cylinder, tractor-type motor. It is available on broad-faced steel wheels, on steel wheels with rubber tires, on I-R trailer mounting, on Ford or Chevrolet truck, or without running gear for mounting on skids, railway cars and similar equipment.—Electrical West, August, 1928.

Compressor Units—Two new styles of compressor units, Type A ½ hp., and Type AA 1 hp. water-cooled machines, have been announced by the **Electro-Kold Corporation,** Spokane. These two types give Electro-Kold an alternative between the two present Type A and Type AA air-cooled, so that water-cooling may be used where necessary, the manufacturer states. These types are used chiefly for commercial and apartment installations. — Electrical West, August, 1928.

Heavy-Duty Reflectors and Holders

The Ivanhoe Division of **The Miller Company,** Cleveland, has announced a new line of porcelain enameled steel reflectors in the R.L.M. dome, shallow dome, standard bowl, standard angle and Glassteel diffuser types with a rolled threaded neck of heavy gage copper. These collars are securely locked into the form and will not become loosened or turn in service.

Holders are available for these reflectors in cast aluminum and stamped enameled steel for attachment direct to the outlet box, also suspension types tapped for ½-in. pipe of stamped enameled steel or cast iron. These holders are supplied with either medium or mogul porcelain sockets.—Electrical West, August, 1928.

Cord Grip Plug Cap

An unbreakable attachment plug cap with an improved type of cord grip is announced by the **Cutler-Hammer Manufacturing Company,** 153 Twelfth St., Milwaukee. The cord grip acts as a positive strain relief and is designed particularly to lessen short circuit hazards, states the maker. Fastening the cord grip is an extremely simple matter and can be done without the use of tools. It is only necessary to screw down on the knurled collar.

The knurled collar wedges a fibre bushing tightly against the cord. The parts are so designed that a natural pressure from the inside prevents loosening of the knurled collar and insures that a firm grip is maintained at all times.—Electrical West, August, 1928.

Reversing Starter

A new automatic reversing starter for alternating current, rated at 15 amp., all voltages, has been added to its line by the **Industrial Controller Company,** Milwaukee.

This device provides remote control,

low voltage and overload protection, and is arranged for either two or three-wire control. The Class 8732 starter has two mechanical inter-locked contactors and is provided with thermal overload relays. Class 8712 is of similar construction and is furnished without overload relays. The mechanism is entirely enclosed in a steel cabinet with baked enamel finish.—Electrical West, August, 1928.

Recent Publications

"Home of Ideas"—In this 16-page bulletin (which is a new and revised edition) the **Bryant Electric Company,** Bridgeport, Conn., presents the architect's front elevation, the various floors, and an attractive view of each room in this "Home of Ideas." The house is completely and economically equipped from the standpoint of wiring device installations. The company states that it takes special pleasure in distributing the bulletin in the belief that its readers may be helped in a wider understanding of the Red Seal plan. Copies will be forwarded promptly upon request.

Electric Water Heating Test—Hynes & Cox Electric Corporation, Albany, N. Y., has announced that it will be glad to send upon request to anyone interested a copy of the "Reports of Electric Water Heating Test on Low Wattage Heaters," conducted at Russell Sage Laboratory, Rensselaer Polytechnic Institute, Troy, N. Y. These reports have been prepared in booklet form for distribution.

Conduit Fittings—The Adapti Company, 2996-3004 East 72nd St., Cleveland, has announced the publication of its supplementary catalog No. 107-A. This catalog supplement features the company's new line of Adapti-lets (solid fittings), also fixture elbows, plug and base receptacles, and self-aligning fixture joints for use with Adapti-lets, Adaptiboxes and all regular standard fittings.

Ice-O-Matic Refrigeration—A description of the Ice-O-Matic refrigerator, the different uses to which it may be put, an explanation of its mechanism, and illustrations of the style of cabinet adopted for its use are contained in a catalog recently distributed by the **Williams Oil-O-Matic Heating Corporation,** Bloomington, Ill.

Diesel-Electric Drive—A set of booklets dealing with this subject has been prepared by the **General Electric Company,** Schenectady, N. Y. The set includes "Diesel-Electric Drive," "Diesel-Electric Drive for Tugboats," "Diesel-Electric Drive for Ferryboats," "Diesel-Electric Drive for Passenger and Cargo Vessels," "Diesel-Electric Drive for Tankers," and two booklets dealing with electric motor and control equipment for deck and under-deck auxiliaries."

Magnetic Controllers—A four-leaf pamphlet published by **The Electric Controller & Manufacturing Company,** Cleveland, describes and illustrates its contactors, relays, resistors, master controllers, limit stops anl cut-outs.

"Modern Refrigeration in the Modern Color Setting"—This booklet is printed by **Servel Sales, Inc.,** Evansville, Ind., and presents in some detail the modern idea of color, particularly as applied to the kitchen. A number of illustrated suggestions are given for kitchen color schemes, centering about the Servel refrigerators, which may be obtained in crystal green, ivory tan, silver gray and Biscay blue, as well as white.

Street Lighting—Two catalogs, "Overhead Street Lighting Equipment" and "Ornamental Street Lighting," published by the **Westinghouse Electric & Manufacturing Company,** East Pittsburgh, give complete information on all street-lighting equipment and appliances manufactured by that company, and in addition describe and illustrate the equipment with photographs, dimentioned line drawings, charts, and line drawings with each part labeled.

Electric Water Heaters—Trade Bulle-No. 51-28, prepared by the **Automatic Electric Heater Company,** Philadelphia, describes its low-wattage, storage-type electric water heaters. The bulletin contains numerous illustrations and diagrams, and a table of operating data.

Automatic Control—"Speeding Up Production with Automatic Control" is the self-explanatory title of Bulletin No. 110, being distributed by the **Monitor Controller Company,** Baltimore, Md.

Super-Automatic Iron—A catalog supplement on the Hotpoint super-automatic iron and other new appliances has been issued by the **Edison Electric Appliance Company, Inc.,** Chicago.

High-Tension Bus Handbook and Catalog—This publication, No. 29, issued by the **Burndy Engineering Company, Inc.,** 10 East 43rd St., New York, contains 120 pages of engineering and commercial data concerning the high-tension bus, with tables, formulas, graphs and other information describing the design, construction and similar phases of bus work.

Arc-Welding Equipment—Under this title, with the subtitle "Variable-Voltage, Single Operator, vs. Constant Potential, Multiple Operator," engineering bulletin 206 is being distributed by the **Lincoln Electric Company,** Cleveland.

Wires and Cables—Two new bulletins have been issued by the **Rockbestos Products Corporation,** New Haven, Conn.—"Rockbestos A.V.C. Cables" and "Rockbestos Wires and Cables." Both illustrate the various wires in question and some of their many applications.

"The Radio Market"—The Radio Division of the **National Electrical Manufacturers Association,** 420 Lexington Ave., New York City, has announced publication of "The Radio Market." This is based on statistics gathered by the Department of Commerce in cooperation with the N.E.M.A. and is said to be a most comprehensive study. Copies may be obtained upon request of the association headquarters at a cost of $2 each.

Fine Switches and Wiring Devices—Under this title the **Hart & Hegeman Manufacturing Company,** 342 Capitol Ave., Hartford, Conn., has issued its catalog T. The catalog contains 120 pages with numerous illustrations.

Indoor Terminal Cables—This is the title of Catalog 711 being distributed by the **Standard Underground Cable Company,** Seventeenth and Pike Sts., Pittsburgh, Pa. The information contained in the catalog is in very complete form, and there are numerous illustrations, cross-sectional drawings and tables.

"Groundology"—Bulletin 70, entitled "The Groundology of Electro-grounds, Groundheads, Groundpoints and Groundometers," has been issued by the **Borden Electric Company,** formerly Groundulet Company, Newark, N. J. This bulletin, according to the company's announcement, is a pretty complete treatise on grounding methods for powerhouse, substation and large industrial plant installations. Copies will be furnished to interested parties without charge, upon request.

Protection for Lamps and Reflectors—A complete bulletin in colors describing and illustrating the new Benjamin dust-tight glass cover to protect lamps and reflectors of industrial lighting equipment from dust and dirt has been published by the **Benjamin Electric Manufacturing Company,** 120 South Sangamon St., Chicago.

Multi-Stage Centrifugal Pumps—A 30-page booklet featuring the Cameron line of multi-stage centrifugal pumps, Class "HMT-HST," is being distributed by **Ingersoll-Rand Company,** 11 Broadway, New York. Much attention has been given to the illustrations, which are very numerous.

Statistical Data for the Electric Light and Power Industry, 1927—This is the self-explanatory title of Bulletin No. 2, issued by the **National Electric Light Association,** 420 Lexington Ave., New York City.

Bearing Construction—Bulletin 156 of the **Wagner Electric Corporation,** 6400 Plymouth Ave., St. Louis, Mo., fully describes and illustrates the improved sleeve bearing and double-cap ball bearing construction employed by that company.

ELECTRICAL WEST Barometer of Industrial Activity in Western States

Reports received on the consumption of electrical energy by the manufacturing plants of the Western states indicate that the rate of operations in these plants during the current year has been on an average some 2.7 per cent under that during the same period last year. Since the opening of the year only two months have witnessed operations above those of the same months of 1927. June, the closing month of the first half witnessed operations on a plane 6.3 per cent under June last year, and the index of operations was the lowest since December, 1925, with the single exception of March last year.

Varying tendencies are being witnessed among the industrial groups of the Western states. Lumber, the most important industry in the section, has been reporting a continuously high rate of operations since the opening of the year, notwithstanding the fact that this industrial group in other sections of the nation has not been up to last year's mark. The peak of operations in the lumber industry of the West seems to have been reached in May, and while June witnessed a slight decrease in activities, yet the June rate of operations was still 14.7 per cent above June last year. The June operations in the lumber and its products industry in the nation as a whole, however, were 3.8 per cent under last year.

On the other hand, the food and kindred products industrial group in the Western states has been reporting operations under those of 1927 for the past three months, the June operations being on a plane 16.3 per cent under June, 1927. The food industry in the nation as a whole reported June operations 8.3 per cent under June, 1927, so that the low rate of operations in the food industry was apparently not confined to any one section of the nation.

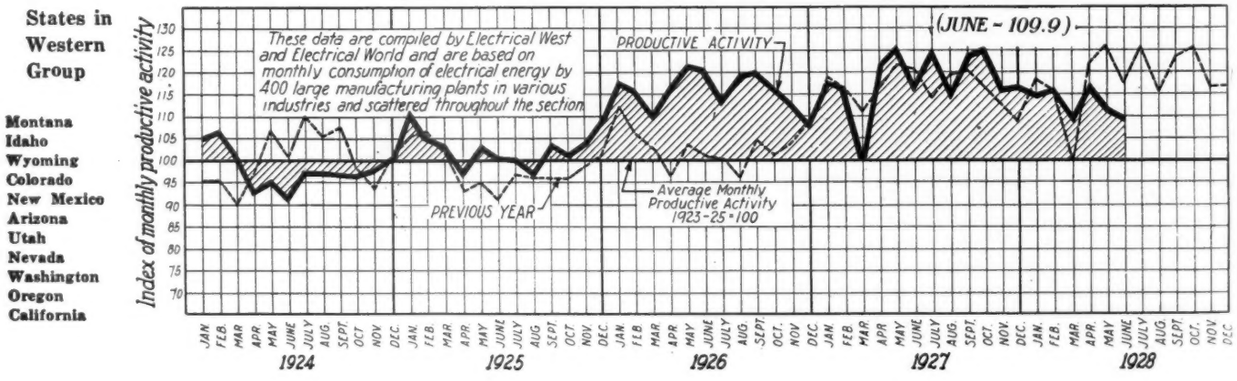
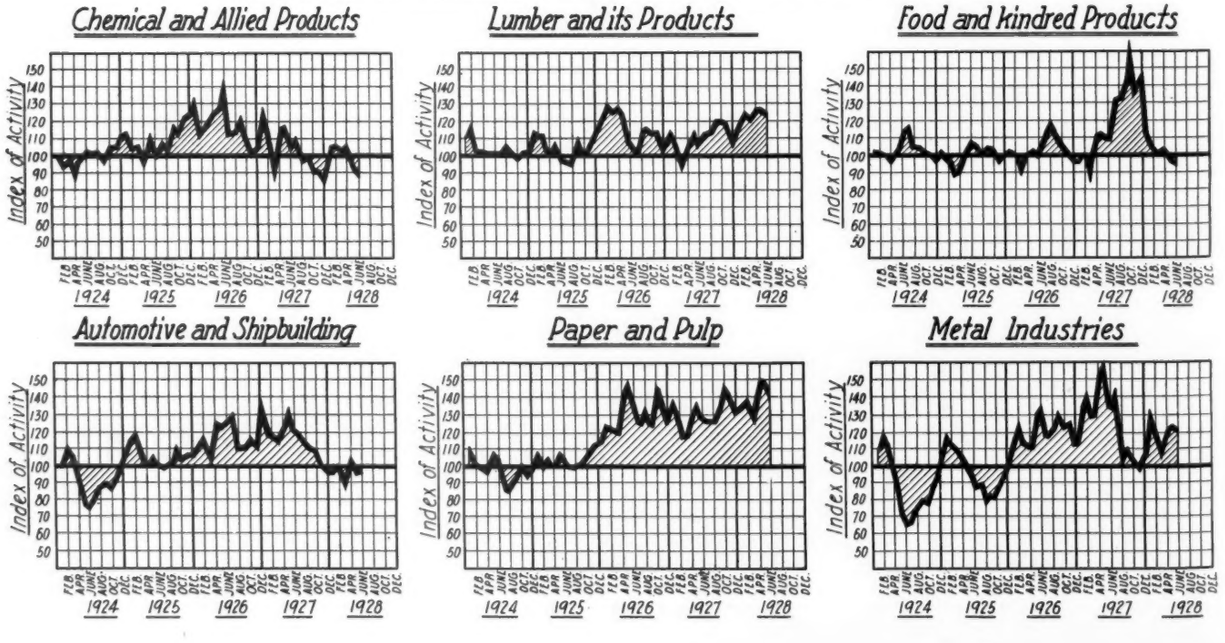
INDEXES OF INDUSTRIAL ACTIVITY IN THE WESTERN STATES

(All figures adjusted for number of working days.)

	June 1928	May 1928	June 1927	Av. 1st half 1928	Av. 1st half 1927
All industry	109.9	112.9	117.2	113.7	116.9
Chemicals and allied products	88.2	90.0	106.5	100.2	110.7
Food and kindred products	93.2	97.4	111.3	102.3	108.2
Lumber and its products	125.6	128.2	109.4	124.4	110.1
Metals group	122.2	124.0	136.8	123.3	143.9
Paper and pulp	144.5	150.0	130.7	141.9	132.2
Rubber and its products	136.8	133.7	121.5	144.1	.....
Shipbuilding	95.7	94.2	123.4	96.0	125.9
Stone, clay and glass	153.0	154.5	144.8	153.9	

GENERAL PRODUCTIVE ACTIVITY IN THE WESTERN STATES

- Adjusted for number of working days but not for seasonal variation.



PRODUCTIVE ACTIVITY IN THE PRIMARY INDUSTRIES OF THE WESTERN STATES